

Published on the First of  
each month by  
MAGAZINES, Inc.  
53 West Jackson Boulevard  
CHICAGO, ILL.

Established in 1880

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Entered as second class mat-  
ter Oct. 17, 1917, at Post Of-  
fice at Chicago, Ill., under  
Act of March 3, 1879.

THE NATIONAL FRUIT MAGAZINE OF AMERICA

# AMERICAN FRUIT GROWER MAGAZINE

SUBSCRIPTION RATES

One year 50c Three years \$1.  
Five years \$1.50.  
Foreign \$1.00 per year

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ADVERTISING RATES

\$2.25 per agate line flat.  
\$11.50 per inch per insertion.  
Classified 15c word.

Volume XLIX

MARCH, 1929

Number 3

## How about Our SPRAY MATERIALS?

*A Comparison in the Rate of Progress Between Spray  
Equipment and Spray Materials, Together with Some Obser-  
vations as to Possible Reasons for the Wide Difference  
Between the Two Rates of Progress*

By CHESTER G. CAMPBELL

Managing Editor, American Fruit Grower Magazine

SOME THIRTY YEARS ago the Concord grape was one of the most profitable fruit crops on soils and in locations adapted to its culture. These locations were to be found in several states, but usually isolated from each other by intervening areas not so favorably adapted to the grape. Insects and fungi peculiar to the grape could not rapidly spread from one grape district to another.

Let us briefly consider the experience of the southern Michigan grape growers when the black rot (*guignardia biduchii*) made its initial appearance in that district in the early years of the present century. I am selecting this bit of ancient history because that was my home at the time and from a picture of the conditions then and now we may be able to draw a comparison between two types of progress.

After waiting two seasons for Providence to temper the plague of black rot, the southern Michigan growers, whose grapes were riddled and who faced ruin, began to give heed to the advice of the United States Department of Agriculture pathologists. Then spraying came reluctantly to be accepted as a necessary operation in grape production.

### Primitive Machinery and Materials

Let me give you a picture of my spraying equipment, bearing in mind it's a quarter-century ago. On a platform of planks some six feet from the ground, within as convenient reach as possible, were to be found the following items:

Two 50-gallon barrels, with spigots, one each for the lime and the copper sulphate; a barrel of copper sulphate; some sacks of hydrated lime; a tub of fish-oil soap; another tub of low-grade molasses; a large crock containing arsenic and sal soda, home-boiled into solution the night before; a can of nicotine sulphate; scales, dippers, pails, paddles, troughs, graduated measure; one strainer of gunny-sacking on a barrel hoop for the copper sulphate, and a fine-mesh brass strainer for the resulting fearful concoction in process of manufacture at this farm chemical laboratory.

If I neglect to include the carboy of ammonia and the barrel of copper carbonate in the list, it is because they would not be used until later, as a final gesture, and I have no wish to distort the picture.

Let me now describe the sprayer: A 50-gallon tank on two wheels, drawn by two horses, with a seat for the driver. The pump was a tiny three-cylinder affair, immersed in the spray liquid, the plungers driven from eccentrics on a jack-shaft above the tank, revolved by chain drive from one wheel of the cart. Two spray "booms" of three nozzles each delivered the spray to one side of two rows of grapes. A pressure of 30 to 45 pounds was maintained if the horses walked briskly and

the candle-wick pump packing held. Which it usually did not. The driver sat between the spray booms, received most of the spray, and in spite of a vigorous scrubbing went to bed every night copper-plated from head to foot.

Primitive? Of course. It was 25 years ago. Every year since has seen some definite progress in spraying

volume of spray mist was needed, together with higher speed in application, and the spray gun was forthcoming.

Experimental Horticulture worked hand-in-hand with Industry for the development of better equipment, and out of this close and even cordial relationship has come a high degree of mechanical progress, wholly beneficial to the fruit industry.

A good share of my time during the past 20 years has been spent in contact with the growers, scattered throughout the country, and some beliefs, or opinions, if you will, have been forced upon me by listening to the growers and from observation of their methods and results. Large numbers of them are not entirely satisfied with the old materials; they want something better, and increasing numbers of them are using materials which they at least think are better.

Yet, if we are to take the general run of station spray schedules at face value, our old spray stands of 25 years ago are, with but few changes, modern today. True, we use arsenate of lead now, but that advance was made in the teeth of experimental advice. I well remember one widely circulated bulletin from one of the great stations of America regretfully announcing that arsenate of lead had been weighed in the balance against Paris green as a fruit insecticide and had been found wanting.

Liquid lime-sulphur concentrate was officially accepted only after many of the growers were using it. Nicotine sulphate was accepted more readily. There is not everywhere readily available a supply of tobacco stems the grower can still be advised to gather and steep.

Some hardy grape growers now hook their tractors to power dusters and blow copper dust through four rows of grapes, claiming they get as good control in a tenth of the time required for liquid treatment.

I have talked with and listened to fruit growers in several states who use what they consider to be improved forms of lime-sulphur. These growers claim the heavier, healthier foliage and consequent increased size of the fruit, together with its finer finish, makes profitable the use of more modern material.

But in these and similar instances the growers have experimented and have hit on what they believe to be more profitable methods. Other growers have experimented with new materials to their loss and damage. Why should the grower have to experiment to obtain better chemicals, when the stations consulted with industry to give him better equipment?

Were we to venture a diffident opinion at this point, it would be to the general effect that experimental horticulture has handled the whole spray chemical situation wrong-end-to. Let us see if we cannot draw some inferences from the mechanical side. (To Page 23)



Experimental Horticulture worked hand-in-hand with Industry for the development of spraying equipment, and out of this cordial relationship has come a high degree of mechanical progress, wholly beneficial to the fruit industry. But how about our spray materials?

equipment. The power sprayer was developed and has been improved and refined to a point where it compares favorably with mechanical equipment in other lines.

### Advance in Spraying Equipment

Our experiment station workers have taken the growers' requirements for equipment to Industry, which alone is capable of producing effective equipment. They said to Industry, "Give us more power," and engines were built that produced the power. They demanded higher pressure, and pumps were created on scientific lines that had pressure, and to spare. Then greater

# There is a RIGHT WAY to PLANT and PRUNE the Fruit Tree

EVERY YEAR a large number of nursery fruit trees either fail to grow or make a very unsatisfactory growth on account of careless handling or delay in setting. The trees may have been grown well in the nursery and may represent the best stock. The digging, storing, packing and shipping methods may have been the best. If the trees are poorly handled upon arrival and are not transplanted properly, they may be a disappointment, in which case the nurseryman is often blamed when the fault is really with the purchaser and planter.

## Digging, Packing and Shipping

Trees should not be dug in the fall until they have fully matured, hardened and prepared their wood and tissues for winter conditions. This maturity of growth is generally indicated by the dropping of the leaves. Stripping the leaves before they drop of their own accord to hasten the time of digging may be injurious to trees. As long as the leaves remain on the trees, they serve a useful purpose in helping to store sugars, starches and other materials in the wood, which facilitates the hardening or ripening processes of the trees.

The digging may be done any time the soil can be worked after the leaves drop and before the buds swell in the spring. It is not advisable, however, to dig when the temperature is below freezing.

For only a few trees, spades and hoes may be used to lift the trees. On a somewhat larger scale, a turning plow is often operated to throw a furrow away from the trees on each side of the rows, after which spades are used in removing the trees from the soil. In large commercial nurseries the tree digger drawn by horses, steam or gasoline engine is employed.

Trees dug during late fall or early winter after the leaves drop and stored properly are protected against possibility of winter injury. Trees dug in the fall, if given the right care and attention during the winter, should be in splendid condition for growth the following spring. In packing, care must be taken to prevent drying out, heating, freezing and breakage during transit. To reduce the cost of postage or express, as little moist packing as possible should be used. If the package is too wet it may be refused by the post office. Some of the best packing materials are sphagnum or chaff, oiled or paraffined paper, express paper, stout twine, corrugated paper and light wooden boxes.

Large shipments are packed in boxes. Small trees are placed in the box in bunches according to size. Packing and battens are used as necessary to completely fill the box. The cover is nailed on and the address painted or inked on with a brush. Shipping tags containing the names and addresses of both the shipper and the person to whom the trees are sent, may also be tacked or tied on the boxes and bundles.

For small packages, the roots are freed of earth, straightened and laid close together, the tops all pointing one way, and enough trees are put in one bundle to make a package three or four inches in diameter. About one inch of damp moss is used to cover the roots. Oiled or paraffined paper is placed around the moss in such a way as to make a firm or solid package. The bundle is finally completely wrapped in manila paper, leaving perhaps only the tips of the trees protruding. Ties are made around the center once or twice and across the ends. The address is written on the package and also on the attached shipping tag.

## Plant the Best Fruit Trees

It is false economy to plant inferior or low grade fruit trees. The best trees which can be secured will, in the end, be the most economical and profitable. Growers generally do not give enough consideration to the matter of planting stocky, healthy, vigorous trees instead of small, weakly, unthrifty trees. Success or failure may depend upon the vigor of the nursery stock used. Whether propagated at home or purchased from a commercial nurseryman, the importance of obtaining the best nursery stock cannot be over-emphasized. Investigations at this station and elsewhere have shown that growthy, vigorous, well-matured trees withstand transplanting better, are more resistant to dangerous insects and fungous diseases, come into bearing earlier and develop into a more profitable orchard than do

*Starting With the Best Stock You Can Secure, Take Pains to Attend to Each Detail of Handling and Planting Your Trees in the Right Way. Painstaking Care at This Time Is One Step Toward Success*

*By J. J. TALBERT*

*University of Missouri*

small, stunted, less vigorous and immature fruit trees.

## Time to Plant

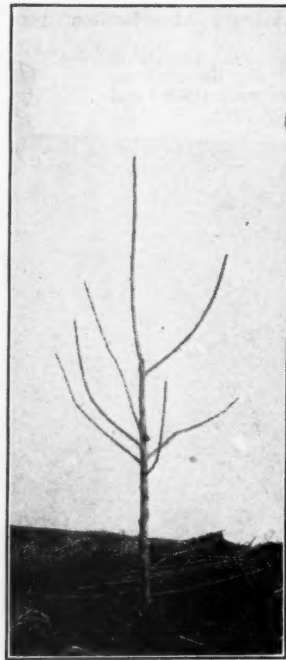
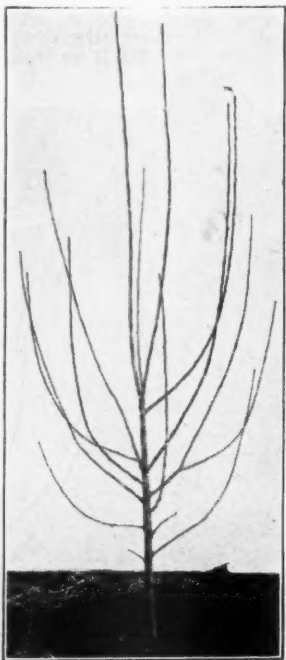
Fall and early winter planting of apple and pear trees generally gives better results in Missouri than spring planting. The results are not sufficiently better,



Setting Out and Pruning  
The Two-Year-Old Tree

Above. Tramping the soil in planting a two-year-old apple tree.  
Left. The same tree after setting out and before pruning.

Right. The same tree after pruning.



however, to justify waiting a year to plant in the fall or early winter. For the central states, north and west of Missouri, spring planting is generally the practice, as less danger from winter injury occurs.

In Missouri, it has been customary to plant sour cherries (sweet cherries are not generally grown), and other stone fruits, in the spring. They are regarded as being the most difficult of our orchard trees to transplant successfully. When planted in the spring, often from one-third to two-thirds of the trees die. This large mortality of cherry trees necessitates repeated replanting before a full stand of trees is secured in the orchard.

The occasional fall plantings of sour cherry trees, made at the experiment station, have uniformly resulted in a good stand of trees. Sour cherries set in the fall have uniformly transplanted as successfully as apples or other fruits.

In central Missouri peach trees prove to be planted more safely in spring than in the fall. If a severe winter follows autumn planting of the peach, the trees are often killed. Even in milder winters, the wood is usually injured sufficiently to turn brown within. With such injury, the trees frequently die and at best make poor growth.

Japanese plums and other slightly tender species subject to winter injury in this section are more safely

planted in the spring. Hardy plums, however, usually profit by fall and early winter planting to about the same degree as do apples and pears.

As soon as the trees are received, examine the roots to see if they are moist. If they are not, moisten them at once and keep them so until heeled-in or transplanted. The roots should never be allowed to dry out or to be exposed to the wind and sun for even a few minutes. When planting, the roots of the trees may be kept in a barrel partly filled with water, or they may be covered with damp packing material, or wrapped in damp gunny sacks.

If the trees cannot be planted immediately upon arrival, they should be heeled-in as soon as possible. This is accomplished by digging a shallow trench and covering the stems or trunks with moist earth. It is important that the ties of the tree bundles be cut and the trees spread out in the trench, so as to allow the moist soil to come in close contact with the roots. When the trees are spread out in the trench, the varieties may be distinguished by marking and driving stakes between the different lots.

Should the trees be badly dried out when they arrive, bury them completely in damp, but not wet, earth. If left in the ground from four to six days, they may be restored to the proper condition for planting.

The roots of young, dormant fruit trees are easily killed by freezing. The roots will not endure the low temperatures to which the top may be exposed without injury. Trees are easily injured if the roots are allowed to dry out in handling.

## Preparation of Soil

On well-drained, typical fruit soils, deep plowing and thorough harrowing or disking as in the preparation of land for such

crops as potatoes, corn or wheat should give good results in setting a young orchard. Soil well prepared, friable, loose and in good working condition, generally grows much better trees during the first few years than unplowed or poorly plowed and cultivated land. Good farmers would not think of planting truck or field crops without thorough preparation of the land. For profitable results with the young orchard, it is just as important to properly prepare the soil for the planting of fruit trees, which are to remain over a period of years.

The distance of planting trees varies on account of soil, variety, pruning practice and climatic conditions. The space between apple trees ranges therefore from 30 by 30 feet on the thinner soils to 40 by 40 feet on the richer and more productive soil types. Most growers make the mistake of planting too close. A distance of about 34 feet for the less fertile soils and about 40 feet for the better soils is generally satisfactory. Pears are

usually planted from 24 to 30 feet apart each way; peaches, 20 to 24 feet; plums and cherries (sour), 24 to 30 feet. The tendency is to plant trees farther apart. The need for greater distance between trees is based upon experimental evidence from orchards of the past and present which have almost without exception been planted too close for the most profitable yields.

A greater distance between peach trees is not only to prevent the interlocking of the branches when the trees come into bearing, which would hinder orchard operations, but also to reduce competition between the root systems of the trees. As a rule, the roots extend much farther in all directions than do the branches. In fact, the roots often overlap and compete for moisture and plant food long before the branches of opposing trees interfere with one another.

## Laying Out the Orchard

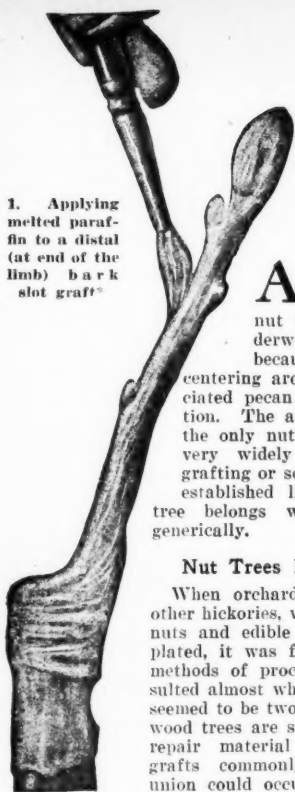
The square system of laying out the ground for planting the orchard is generally used because it is less difficult and more satisfactory. One of the most common ways of laying out the land for planting on the square plan is to establish a base line on one side of the field. This base line is usually not less than 20 to 30 feet from the fence or road and may be made the line for the first row of trees. End (To page 19)

# A NEW METHOD in GRAFTING

By ROBERT J. MORRIS

Author of NUT GROWING

1. Applying melted paraffin to a distal (at end of the limb) bark slot graft.



ABOUT the beginning of the present century, propagation of nut trees by grafting underwent rapid development because of large interests centering around the newly appreciated pecan as a market proposition. The almond was practically the only nut tree which had been very widely propagated by bud grafting or scion grafting along old established lines, but the almond tree belongs with the peach tree generically.

## Nut Trees Difficult to Graft

When orchards of pecans and the other hickories, walnuts, filberts, chestnuts and edible acorns were contemplated, it was found that established methods of procedure in grafting resulted almost wholly in failure. There seemed to be two basic reasons. Hardwood trees are so slow in sending out repair material and callusing that grafts commonly dried out before union could occur at grafting wound sites. Another factor in failure appeared to relate to the sugar content of free flowing sap of hardwood trees, this sugar content being attractive to organisms which cause fermentation of sap with consequent destruction of new repair cells.

Practically no new principles in grafting had been introduced for more than a century. Changes that were made consisted in improvement in technique rather than in change of principle. The late Henry Hales of Ridge-wood, N. J., with dogged persistence sent hundreds of shagbark hickory scions to expert nurserymen in different parts of the country for years with almost complete failure, while today thousands of acres of grafted kinds of hickories are now under way in this country.

## A Great Forward Step

The first great step forward in hardwood grafting was made by the late E. A. Riehl of Godfrey, Ill., who was successful in preventing the grafts from drying out by covering them completely, buds and all, with melted grafting wax. The late J. F. Jones of Lancaster, Pa., popularized the Riehl method by taking it out of the field of trade secrets and giving it to the world in the interest of public service. The amber colored grafting wax used by Mr. Riehl, while overcoming desiccation, did not dispose of the factor of fermenting sap, and the black wax used by Mr. Jones seemed to attract the heat ray of the sun so that employment of this wax required special shading methods for each graft. (Shading with a roll of newspaper is worth while anyway in general.)

The proportion of failures was still disturbing to nut orchardists. It was probable that the amber colored grafting wax of Mr. Riehl and the black grafting wax of Mr. Jones interfered with the actinic (photographic) ray of light which is extremely valuable for promoting the activity of bud chlorophyll which acts only in the presence of light and in the best way in the best light.

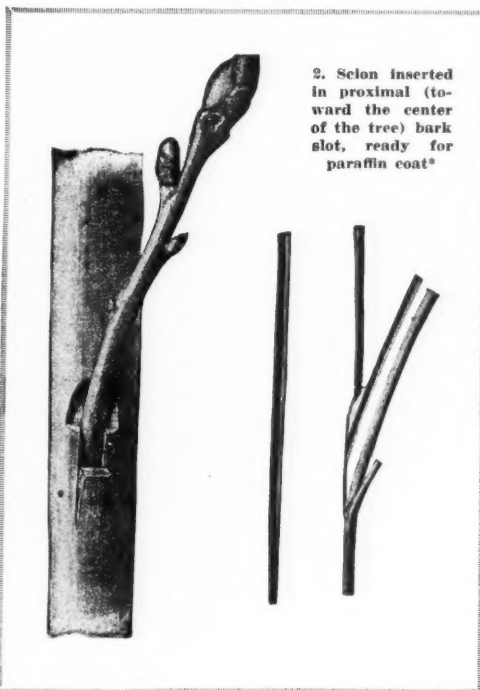
## The Use of Paraffin

Then arose the question of employing melted paraffin in place of other kinds of grafting wax. When melted paraffin was employed for covering the scions, buds and all, as well as the wound in the stock and the wrappings, the method immediately proved to be a success. In fact, this new method seems to have changed the entire subject of grafting in such a way that almost anyone may now do almost any sort of grafting.

Melted paraffin fills all spaces in which sap might collect and ferment, but at the same time hardens quickly and forms a protective covering. Impervious to moisture, it prevents desiccation of the graft. Furthermore, as an air-tight covering, it allows the graft to share with the stock in both positive and negative sap pressures which take place during changes of light and

\*Figures 1, 2 and 3 from "NUT GROWING," by Dr. Robert T. Morris, copyrighted by The Macmillan Company, New York. Used by permission.

An Explanation of the "Paraffin Method" in Grafting Which Has Been Described as "A Most Revolutionary Forward Step in Propagation." The Method Can Be Used Generally for Hard and Soft Wood Grafting, and Can Be Performed With Success at Any Time of the Year.



2. Scion inserted in proximal (toward the center of the tree) bark slot, ready for paraffin coat.

we mean the taking of a scion from one tree at any time of the year and placing it immediately in the tree to be grafted. Mediate grafting with dormant scions may be made in very early spring before the farmer is busy with his planting, and immediate grafting with scions cut from growing trees may be done at almost any time in the summer. In the latter instance, however, we cut off all of the leaves and new growth of the year from a scion and depend upon latent buds in scions cut from wood a year old or more.

In mediate grafting with dormant scions put in place during the time of greatest spring activity of the plant, we secure the greatest degree of growth in the first year. With immediate grafting, on the other hand, an apple or pear will commonly make only a short growth and come early to a state of rest with its top bud in the first year. The difference really seems not to be of great consequence.

## Method Useful in "Bridging"

Both mediate and immediate bridge grafting for trees that have been girdled by mice or rabbits may be conducted successfully, and the wood that has been exposed through the action of rodents is thoroughly protected against attacks by fungi and bacteria by a coating of melted paraffin. This also holds good for the wood of cut ends of larger limbs which have been sawed off in the course of top-working a stock tree with grafts. New cells, including the protective corky layer, will sometimes extend widely and rapidly beneath a coating of paraffin which has been applied in melted form over the cut ends of limbs or over wood exposed by rabbits or mice.

The technic of preparation of the stock for receiving a graft introduces no new principle, but there are certain points which may be mentioned to advantage, particularly in relation to top-working. The old technic in apple tree grafting, for example, consisted in splitting open the end of a limb for insertion of grafts. This is a laborious process and is often met with failure, except in the hands of experts. My own preference now is to saw off a limb close to a little branch and then graft twigs of this little branch with scions of twig diameter, using either the splice graft or cleft graft method.

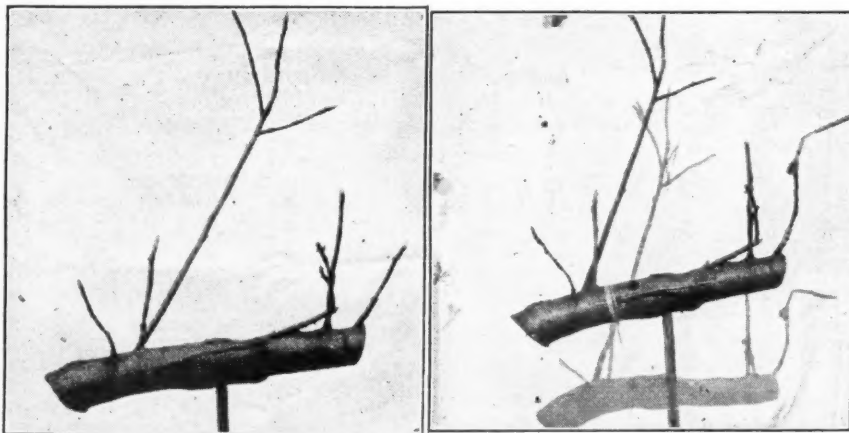
The old deep cleft method gave room for collection and fermentation of sap. The newer plan disposes of that, and it sometimes allows us to place half a dozen grafts on a small branch instead of the two customary ones in the cleft branch of large diameter.

## The New Technic

Another point in technic consists in introducing the bark slot for the sides of limbs. When making the bark slot in the side of a limb, parallel lines the width of a scion are cut through the bark. A cross cut at the top allows this tongue of bark to be turned out for insertion of a scion cut wedge shaped in the ordinary way. A few turns of

raffia then secure the tongue of bark firmly against the scion and melted paraffin is placed over all. If a single bud of a graft is left uncovered with melted paraffin, one part of the mechanical principle is lost, that of maintenance of equal sap tension in tree and scion. Not one bud should be left uncovered with melted paraffin.

There is always a tendency to place too thick a layer of paraffin on a graft. An extremely thin one will suffice, although buds burst through almost any thickness of paraffin or other grafting wax with which they are covered. The advantage of the very thin layer relates to expansion and contraction under the influence of sun, cold or rain. The very thin (To Page 29)



4. Left. Instead of the customary two scions at the end of a cleft apple limb, we have here seven grafts on twigs of the limb and two bark slot grafts on sides of the limb. Right. Same view, showing, at extreme right, method of applying melted paraffin to graft with a brush.

practice, we find that this interference with the respiration of the graft need not be taken into account.

## Also Used in "Soft Wood" Grafting

A method for successful grafting of hardwood trees having been developed, it was found that this might be applied equally well to the grafting of apples, pears and other so-called soft wood trees. Furthermore, it allowed us to extend grafting operations over several months of the year, disposing of the hurry going with spring grafting at a time of the year when growers are very busy with their spring planting. The new method allowed of so-called "immediate grafting." By that

# PASTURING BEES in ORCHARDS PAYS

*Where Deciduous Fruits Are Heavily Planted in Any Section, the Problem of Pollination Becomes Acute. A Knowledge of Relative Fertility and Sterility of Variety Blossoms Aids in Reaching a Solution of the Problem.*

*By A. H. HENDRICKSON*

*University of California*

POLLINATION has been found to be an important factor in securing a profit from many varieties of deciduous fruits, especially some of the plums and other stone fruits. Pruning, spraying, cultivating and irrigating as required must not be neglected if best results are desired.

Pollination is important because it must take place during a short time in the spring, and unless it occurs there is no way to secure a crop until the following year. Pollination provides the stimulus which causes the young fruit to grow and mature instead of dropping when it has reached the size of a small pea.

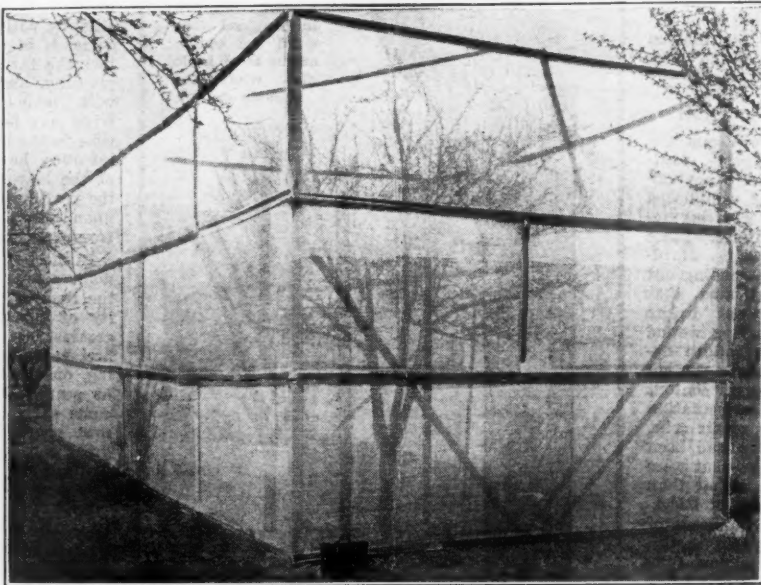
Before the orchard business reached its present development, pollination gave but little concern. The total number of trees was small, and pollen-carrying insects were abundant. Furthermore, many of the early varieties were chosen because of prolific bearing rather than quality. Hence, heavy crops were the rule. Of recent years, following a search for quality, the varieties now being grown in many cases are weak and do not set unless all conditions are favorable. Investigations by the Division of Pomology of the University of California have shown that many kinds of tree fruits can be aided in setting a crop, if the proper varieties are interplanted for the purpose of cross-pollination.

It is interesting to note briefly the history of the plum pollination problem. A report from the Iowa State Horticultural Society in 1881 stated that several of the native American plums bore better crops when several kinds were planted together. Dr. L. H. Bailey of Cornell University observed the same thing with both the native American and Japanese plums. Prof. Waugh of Vermont from 1896 to 1901 found that all American and Japanese plums were self-sterile. In 1897, the late Dr. J. C. Whitten reported a list of plums that were capable of setting fruit with their own pollen. The same year a grower in New York reported splendid results by interplanting the Abundance and Satsuma varieties. Prof. Waite of the United States Department of Agriculture in 1905 reported that Abundance, Red June, Burbank and Wickson were self-sterile under eastern conditions. These reports showed the tendency

to sterility among the Japanese varieties.

Dr. U. P. Hedrick in the "Plums of New York" stated, "It is held by many that it is hardly safe to plant any except the Domestica and Insititia plums without

Of recent years much work has been done in California on various deciduous fruits. Sweet cherries and almonds were found to be self-sterile practically without exception. On the other hand, apricots



Tents used to demonstrate the value of bees in carrying pollen from tree to tree

provision for cross-pollination." From 1911 to 1916 several English experimenters gave their results and published lists of self-fertile and self-sterile varieties, and it is of interest to note that French prune was found self-sterile in England while in California it is self-fertile.

and peaches which are grown extensively seem well able to set abundant crops with their own pollen. The sterility of certain varieties of pears seems to be influenced by climatic conditions. Thus, certain varieties of pears which are self-fertile under interior valley conditions are practically

self-sterile when grown near the coast. Most of the apple varieties studied seemed to be self-sterile or at least unable to set satisfactory crops with their own pollen.

The use of bees in connection with pollination experiments in different states has almost invariably shown that the presence of these insects in the orchard during the blossoming season has aided materially in increasing the set of fruit, even with varieties considered self-fertile.

## Use of Bees in Orchards

It has been well known for years in a general way that bees carried pollen from blossom to blossom and that as a rule larger crops were produced thereby. As early as the 17th century, Thomas Andrew Knight pointed out the necessity for cross-pollination, and later Darwin showed the need for the same thing and pointed out some means used by nature to secure cross-pollination and prevent self-pollination. United States Department of Agriculture reports in 1884 called attention to marked results from the use of bees in California. About the same time several fruit growers in that state gave specific instances attesting to the value of the common honey bee in fruit orchards.

In the meantime, large acreages had been set out to fruit. Very often considerable areas were planted to a single kind of fruit which blossomed at the same time. In the development of an orchard section, the planting of other crops which serve as pasturage for bees was much reduced. In time there came to be a scarcity of both wild and tame bees. Furthermore, the average fruit grower does not understand how to keep bees. After a few experiences with foul brood and other bee diseases, most growers generally give up trying to keep bees.

The shape of the blossoms of most deciduous fruits and the manner in which they open is not conducive to self-pollination. The stigma or receptive organ is often ready for pollination before the pollen is ripe. Consequently, the pollen from any given flower must be transferred to another blossom which opened several days later to be effective. Furthermore, the position of the male and female organs is such that pollination within a

(To Page 24)

# The Production of Small Fruit Plants

*The Care Used in the Production of Small Fruit Planting Stock Is One of the Most Important Factors That Will Determine the Success or Failure of the Plantation.*

*By FRANC L. DANIELS*

*University of Minnesota*

THE TYPE of plant used to establish a field of small fruits is a major factor in determining the success or failure of that planting, for in the majority of cases a planting carries the stamp of its foundation stock throughout its life. In view of this fact, it behooves the careful fruit grower to purchase only the best stock available if he buys his plants, and to exercise every precaution if he produces his own stock.

Although each of the several classes of small fruits commonly calls for a different type of propagative method, there are certain general principles that are requisites to proper plant production in all small fruits. These will be discussed first, and then the particular problems of a few individual classes.

## Requisites of Proper Planting Stock

If planting stock is to be satisfactory, it must have, in addition to others, the following four qualifications of outstanding importance:

First, it must be true to name; second, it must be free from disease; third, it must be well grown; fourth, it must be alive and capable of making quick, vigorous growth when received by the planter.

Truthfulness to name is obtained only by eternal vigilance and care on the part of the propagator and his employees. Propagating stock must be selected with the greatest of care, and equal vigilance must be used to see that there is no mixing of varieties. In some types of plants, rogues may be identified by characteristics of

foliage, wood or thorn and eliminated wherever they occur.

## Plants Must Be Disease-Free

Perhaps no factor has a greater limiting power on the productivity of certain small fruit plantings than disease. Fortunately for the grower, the nursery inspection services in various states now have this matter well in control, and by exercising proper diligence, the producers are able to put out plants far superior in this respect to those available a few years ago.

Three types of disease may be carried in planting stock: fungus, bacterial and systemic or virus. Of these, the latter two are of outstanding importance in selecting planting stock. Bacterial diseases, such as crown gall in the brambles, are held down by the use of stock which is clean and by using ground which is free from disease. It must be borne in mind that the organisms causing this trouble may persist in soil for a number of years after the host plant has been removed, and clean stock will soon become badly dis-

eased if planted on soil that is infected.

It is diseases of the virus type, such as mosaic in raspberries, that have received the most attention in recent years. Diseases of this sort affect the entire plant, producing a devitalizing effect sometimes described as "running out," a condition characterized by decreasing vigor, smaller growth in both cane and leaf, poorer foliage color, and dropping off in both size and yield of the fruit. These plantings are seldom profitable for any length of time. Although the organisms causing these diseases are not known, it is an established fact, first, that they soon spread from diseased to healthy plants close at hand, and, second, that the fields of disease-free plants may be kept clean by isolation from diseased fields and roguing of any suspicious plants. Growers and experiment station men have now come to consider freedom from mosaic and diseases of similar type one of the foremost considerations in the selection of planting stock.

To be satisfactory as foundation stock, plants must be well grown, with strong

tops and heavy roots abundantly supplied with fibrous parts. Plants of this type are obtained only when produced on suitable soils, well fertilized and given thorough cultivation throughout the growing season. High organic content in the soil, as well as abundant supplies of plant food, is essential. Liberal applications of barnyard manure or crops of green manure thoroughly incorporated with the soil before planting will go a long way toward developing the type of plant desired.

In the plants with woody parts, there must be sufficient check in the growth toward the end of the season to allow for proper maturing of wood. Unless thoroughly matured, a woody plant seldom gives the most satisfactory growth the following season, for it will not only be lacking in stored plant food, but is apt to have suffered climatic injury as well.

## Handling the Stock

Lastly, this true-to-name, disease-free, well-grown plant must be so handled by the propagator that when it reaches the planter it is capable of making the vigorous growth desired. It must be alive, and its ability to make quick, strong growth in no way impaired by improper digging, handling, storing or packing on the part of the plant producer. A common cause of injury to plants is drying out through exposure of the roots to air during field handling, in storage, and sometimes in transit on the way to the

planter. Other possibilities of injury to plants well grown and otherwise in good condition, are exposure to excessive heating or freezing in transit. Frequently, and especially in the case of amateurs, serious injury to the plant occurs in the hands of the planter through carelessness in handling and allowing the stock to dry out before placing it in the ground.

#### Selecting Strawberry Runners

Strawberries are gross feeders and because of the limited area their roots cover in the soil, it is important that the ground be very thoroughly enriched and abundantly supplied with humus. As fall maturity is not a factor of importance in the strawberry, heavier nitrogenous applications and later cultivation may be used than in the case of other small fruits.

Carefully conducted experiments in Canada have shown that the bulk of the strawberry crop and the best berries are produced from runners formed moderately early in the preceding year. These experiments have also shown that the heaviest setting of early runners (the best fruit producers) may be obtained from plants of good size which were rooted in middle and late summer of the year previous to planting. All weak or small plants, which includes those that rooted late the preceding fall, should be discarded, together with all two year old or "mother" plants.

In digging strawberry plants, the entire row should be dug. The grower who digs plants off the sides of the row, leaving a strip in the center for fruiting, is leaving behind a large per cent of the best plants for propagation purposes and taking the majority of poorer plants with which to set his new field. Extensive experiments have shown that where the practices recommended above are followed and only the strong plants used, there is nothing to be gained by selecting individually outstanding plants as parents to establish breeding plots of so-called "pedigreed plants." In other words, variations in vigor and production apparent between certain parent plants of any variety are not transmitted by their runners as such variations are due simply to soil or some other local factors.

#### Controlling Mosaic in Raspberries

At the present time mosaic is commanding more attention from growers than almost any one factor in raspberry planting stock. While mosaic is an old disease, its importance, and even its identity, has only recently been appreciated and understood by growers at large. The nursery inspection services of different states, ever eager to protect the interests of the planter, have been quick to realize the importance of mosaic control and have made it possible for him now to obtain stock superior to anything that has been offered in the past. Minnesota is among the pioneers in this move. To combat such diseases, laws were passed making it illegal in Minnesota—beginning in the fall of 1926—to sell or transport raspberry plants which had not been inspected and passed by the State Nursery Inspection Service as being free from disease. The result is that Minnesota has obtained a nation-wide reputation for having red raspberry plants free from mosaic, leaf curl and other systemic diseases and has stepped into the position of the country's most extensive producer of disease-free red raspberry stock, shipping millions of plants (5,000,000 in 1928), chiefly Latham, to all parts of the country annually.

In Michigan the Nursery Inspection Service and in Ohio a group of growers, co-operating with the state authorities, have developed stocks of black raspberry plants free from the virus diseases prevalent in them.

The common practice among extensive red raspberry plant producers now is to propagate by suckers which are cut level with the ground at planting time. At the end of the first growing season all canes are again cut to the ground. This cutting back is a most effective fungous disease control and assures greater freedom from many diseases of this type than can be obtained by any other method. At digging time the entire row is dug clean. At this time any remaining plant parts showing above ground are destroyed. The following season the new suckers are produced in what the year previous had been the

aisle. Unusually fine, strong, vigorous plants are produced by this method and a more successful check of all diseases and insect pests is obtained than by any of the older and more common practices. Special digging machinery has been designed for red raspberries, which cuts under the entire row at one passing in such a manner that the whole root system is removed. Plants dug in this manner naturally carry many more fibrous and

cross roots than can be obtained in the average hand digging process.

In the final analysis, the berry grower is the one who is benefited by the improved methods now available to plant producers. As it is a commonly accepted fact that no single factor exerts a greater influence over the success of a planting than the stock used, it is up to him, the planter, to see to it that he obtains the benefits to which he is entitled through

the use of the best planting stock available.

"Hey, Bill, grab hold of one of those wires."  
"All right," said Bill, "I got one."  
"Feel anything?"  
"Nope."  
"Good! I wasn't sure which was which. Don't touch the other one. It's got 6600 volts in it."

## Dollar-Making Experiences in High Speed Farm Transportation

READER, NOTE: This is the second of a series of Fruit and Produce Growers' Personal Experiences, relating to the Profit Side of the high-speed haulage of farm products and live stock, which should be of especial interest to those who recognize the all-important part that SPEEDY MARKETING plays in making fruit and produce growing PAY.



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and it has cost us less than with any other truck we know of"**

**I**F we were to buy a new truck today we would look no further than another Reo Heavy Duty. In our opinion no truck could give any greater satisfaction than has our present Heavy Duty Reo, which is now twenty-eight months old.

"During that twenty-eight months we have driven it 55,000 miles. We can get more miles per day than with any other truck we know of. It still has two of its original tires running on the front wheels. We had the first blowout at 25,000 miles and the second at 40,000 miles. It has averaged twelve miles per gallon of gasoline fully loaded and two hundred miles per quart of oil.

"The only repairs outside of ordinary brake adjustment, lubrication, etc. has been the replace-

ment of differential gears at 40,000 miles and new piston rings at 42,000 miles.

"To summarize our costs we find the following per mile:

Tires.....	.0033
Gasoline.....	.0133
Oil.....	.001
Mechanical Upkeep.....	.005
(includes lubrication and adjustment)	
Depreciation.....	.03
Interest.....	.005
(6% on total \$2400)	
Insurance.....	.003
Registration.....	.002
	.0626 (6 26/100 cents)

"We would readily advise anyone interested in satisfactory, economical truck operation to buy **Yours truly,**  
**MAXWELL & O'BRIEN,**  
a Reo Speed Wagon." By Gilbert F. O'Brien

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For 14 years, Reo has pioneered the field of farm product transportation.

Farmers' needs have been studied by experts. Then special Speed Wagons built to meet those needs.

Reo does not employ ordinary "salesmen." You talk over your problems with a qualified **Farm Transportation Expert** whose sole business it is to serve you. He tries to "sell" you nothing and if he can't serve you, he won't sell you. Please remember this.

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Over 175,000 Reo Speed Wagons have been built and sold in the last 14 years. Some have been in constant operation 12 to 14 years. Scores have

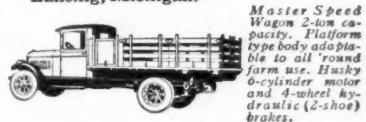
traveled 250,000 to 800,000 miles. Some in bus service have gone 1,000,000 miles and more. That's 25 years of use the average farm would give it.

That's because the **Quality** is there. The engineering, the construction that has made Reo world-leader in its field. Reo has built this type longer than any other maker. Thus no other maker has the experience of Reo in the field.

Consider those facts before you buy. Consider that a farm truck gets more use than any other implement on the farm. Consider that more people see it

than any other implement you own or will ever own.

Consider that what you buy in a truck are dependability, quality, long life—a visible sign of your own standing in your community. Reo Motor Car Company—Lansing, Michigan.



Master Speed Wagon 2-ton capacity. Platform type body adaptable to all round farm use. Husky 6-cylinder motor and 4-wheel hydraulic (2-shoe) brakes.

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# The Practical Value of "Fruit Bud Sports"

By C. O. FINCHUM

In Charge Orchard Research,  
Louisiana, Mo.

**DURING THE LAST** few years there has been considerable interest in fruit mutations. A great stimulus toward this was the discovery of a dark red, early coloring, bud sport of the Delicious apple in the orchards of Lewis Mood, Glassboro, N. J., in 1922. Until that time deciduous fruit bud sports were given only little consideration by the general public, although long interesting to horticulturists. This red Delicious bud sport was named Starking, and since its discovery a large number of other fruit mutations have been called to the attention of nurserymen, research specialists and other horticulturists throughout the country.

Fruit bud sports present themselves in different ways. In the case of the apple, however, the most common occurrence has been the double red color. The Starking, for instance, has twice as much color as Red Delicious. Sometimes a red or yellow variety may produce a limb which bears russeted fruit. Occasionally a limb may produce apples which are different in shape or size from the typical variety. In fact, a good many things are to be expected.

## Typical Bud Sports of the Apple

The following apple varieties are typical bud sports: Starking, Red Rome Beauty, Red Stayman, Black Baldwin, Red Spy, Red Willow Twig, Red Duchess, Crimson Gravenstein, Red Spitzenburg, Red Rambo and double size Grimes Golden. These red strains have very

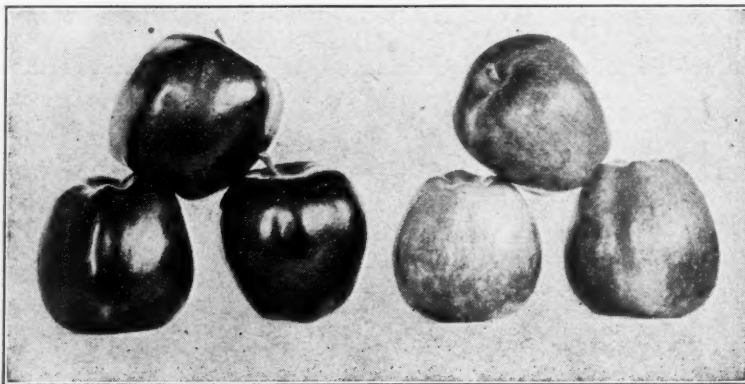
**Are Sports or "Mutations" Permanent? Do They Represent Solid Advance Toward More Nearly Perfect Varieties? Two Writers Give Their Opinions, Each Taking the Subject from a Different Angle, and Reach the Same Conclusion.**

much more color than the original varieties.

In the case of the Starking there was one limb growing on a Red Delicious tree which produced fruit that colored two or

as much color as Red Delicious—a solid dark red all over the apple.

Red Rome Beauty is a bud sport of Rome Beauty. Some years before Starking came to light, the Red Rome was



The three apples at the left illustrate the intense deep red of a typical "red sport" of the Delicious, in comparison with the old Delicious (right)

three weeks in advance of the rest of the fruit. Starking trees are now being grown in orchards in various parts of the country. A good many of them are coming into bearing. Like the original limb, they are bearing apples which have twice

as much color as Red Delicious—a solid dark red all over the apple. Red Rome Beauty is a bud sport of Rome Beauty. Some years before Starking came to light, the Red Rome was

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By R. EDWARD TRUMBLE  
Consulting Horticulturist,  
Wenatchee, Wash.

**THE COMPARATIVELY** large number of new varieties of apples recently resulting from "sport" buds brings to the foreground one of the most interesting questions in the science of horticulture. Why do buds sport, and what will be the future of these new varieties? It is thrilling and stimulates a number of conjectures. There have been nine distinct sports of the Delicious in the Wenatchee district of Washington alone. We have records of five sports of the Rome Beauty; also the Blaxtayan, a sport from the Stayman Winesap; the Gano and Black Ben from the Ben Davis; the Daniels Dutchess of Minnesota, as well as a number of sport variations of a lesser degree on Winesaps, Jonathans, Spitz and other varieties. If this sporting keeps up, one can only imagine the new varieties we may have, and the effect it will have on the fruit industry.

The wide variation among, for illustration, the nine distinct sports we have had in the Northwest in the Delicious, would indicate that each is a decidedly individual sport and that these sports did not come by some accident of fruit culture from the other sports. While these nine sports are all decided improvements on the Delicious, the Richared Delicious is with us probably the most perfect. It has lost all trace of stripes and is a distinct variety.

## How Do Buds Sport?

There are few facts in organic nature upon which scientific thought is more divided than on how buds sport. And since we cannot make buds sport at will, we must confess that we do not know the exact process. However, there are some underlying scientific principles which help us to a better understanding of this old process of Nature. Luther Burbank and Hugo De Vries are notable among the investigators who have worked on this problem, but neither had a definite method of developing or stimulating sports.

## Some Facts About Buds

Before we enter too far into the question of how buds sport, let us consider some facts about buds.

The bud is a short growth axis, closely concealed and surrounded by leaves or leaf parts that it bears. The foliage and flower shoots of all the seed plants come from the buds. It is important to note that the resting buds of trees of temperate climates are the most conspicuous and highly specialized. Such buds are common in all climates where there is an interruption of growth by cold winters, or dryness. Please note in this connection that most of our bud sports have developed in temperate climates where there are cold winters. It is true, also, that the resting bud of many trees includes in miniature the entire vegetative or flowering shoot of the next season. Under such conditions, the rapid elongation of the axis and unfolding of leaves in the spring is followed quickly by the formation of a new resting bud, wherein the shoot of another year is gradually differentiated.

Such other factors that induce differentiation might be mentioned, as the rapid awakening of the bud in the spring, and premature awakening of the bud by unusual or untimely weather. Variations that develop into new varieties arise either in the bud or the seed, one from sexual and the other from asexual bud variations. From the facts noted, it must be apparent that a number of perfectly natural conditions may give rise to decided bud disturbances at critical times, stimulating the tendency to mutation and bud sports, especially in the northern and colder fruit growing districts.

Now what action takes place in the bud to give rise to mutation? It must take place in the process of cell division, during the formation of the new bud. It is too well known to require discussion, that all plants, as well as animals, develop from a single cell by the process of cell division, otherwise our sport bud would be

(To Page 27)

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FIG. 2416

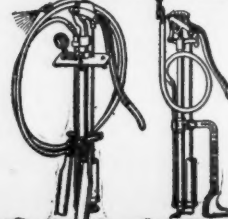
FIG. 2397

FIG. 2405

FIG. 1521

FIG. 1726

FIG. 640



# SPRAY NOTES from the STATIONS

*Below Are Given Some of the More Important Developments in Station Research Work on Fruit Pest Control, Based on Previous Seasons' Experimentation. A Contribution to This Subject by R. L. Webster, State College of Washington, Summing Up the Developments in "Codling Moth Control in the Pacific Northwest" Will Appear in the April Number.*

## Notes from New York

By P. J. PARROTT

New York State Experiment Station  
**C**OMMONLY considered as a pest of minor importance, the bud moth (*Spilonota ocellana*) was exceptionally abundant during the summer of 1928 in western New York. Certain orchards sustained serious defoliation and large losses in fruit yields. One orchard this past summer sustained a loss of 48 per cent, as shown by actual counts of the fruits at the time of picking, while a number had from 25 to 35 per cent of the apples ruined by the pest. Observations of other plantings show larger losses than are indicated by the foregoing figures.

The damage is the result of the operations of the caterpillar in securing food and in building feeding shelters. The period of the occurrence of damage commences with the unfolding of the blossom and leaf buds and continues throughout the summer until early fall.

In the spring, the caterpillars burrow into the buds as they are breaking, cutting the unfolding blossoms and leaves at their base. These structures turn brown, and as a result of interweaving with silken threads, the dead fragments of blossoms and leaves form a tangled cluster about the tip of the injured bud. With the setting of the fruits, the caterpillars often eat into the surfaces of the apples, selecting preferably the point of contact with an overlapping leaf. The injury may produce premature dropping of the young apples as well as deformed fruits, so that a goodly percentage of the crop is unfit for the market.

The caterpillars also attack the leaves for the purpose of securing subsistence or for the construction of feeding shelters. The resulting harm is variable and not easily measured. However, the consumption of leaf tissue can hardly fail to be a drain on the vitality of the trees.

Relative to the factors which have facilitated the activities of the bud moth during recent years, and which have made possible its appearance in such astonishing numbers, there is no definite information. If growers confronted with the problem of combating serious infestation have in recent years omitted nicotine in the delayed dormant application and have applied lead arsenate in subsequent treatments without any reference to the feeding habits of the insect, then a possible explanation is indicated. In this case there is no more important step than to adopt the standard spray program as outlined in the February issue and to drench the trees at each application. These measures derive their chief value from the fact that they are designed principally to prevent serious outbreaks. Irrespective of the spray practices of individual growers, there is no doubt that the bud moth is more abundant than usual, and there are reasons for believing that next season will witness another destructive outbreak. It is therefore desirable that growers consider carefully spray practices with reference to the needs of their apple plantings for a larger degree of protection from this insect.

## The Apple and Thorn Skeletonizer

Automobilists traveling through western New York the past summer, especially in the area just east and south of Rochester, have perhaps wondered what was the cause of the brownish appearance of the foliage of many orchards and roadside trees. This was the work of a relatively new pest known as the apple and thorn skeletonizer (*Homocidus pariana*). It is hardly necessary to state that it is a foreign importation. The pest is spreading westward, making marked strides each year. Commerce is unquestionably accelerating its rate of progress. Recently there was delivered at our laboratory specimens of moths captured in a freight car at Chicago. This is an example of some of the perplexing problems that confront the inspection service engaged in

efforts which seek to prevent the spread and establishment of new plant pests.

The skeletonizer is, fortunately, not a difficult pest to control. Orchards treated according to the standard spray schedule escape damage. On the other hand, neglected plantings present a sad sight. The number of shabby looking orchards in this

general area is striking evidence of the effects of the agricultural depression during recent years, fruit plantings in many instances being neglected by the owners or tenants in favor of other lines of agriculture which are considered, temporarily at least, more remunerative.

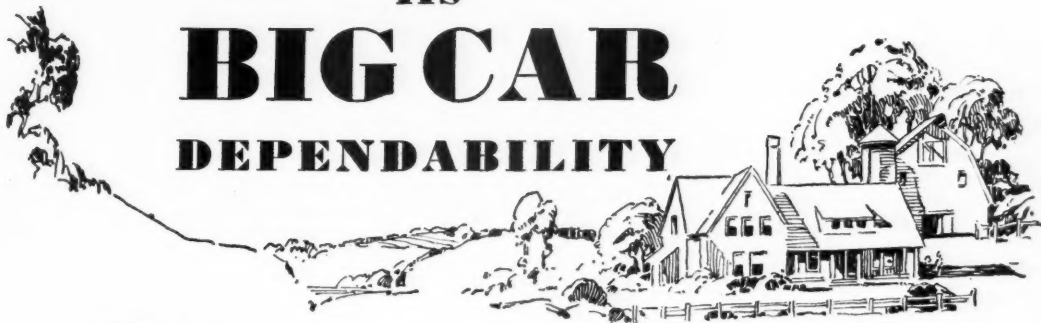
## Oil Sprays for Psylla and Leaf Roller

The severe infestation of pear orchards with the psylla during 1927 stimulated much interest relative to the employment of lubricating oil emulsions to combat the overwintering flies. It not infrequently

happens that a year of superabundant numbers of a pest is followed by a season of comparative scarcity. Such was the case with the psylla during the summer of 1928. The hibernating flies made their appearance in large numbers, and in some plantings many eggs were laid. However, the threats stopped at that point. One inclined to ignore the disappearance of the psylla through natural causes should have had little difficulty in finding orchards supporting his claims relative to the efficiency of his pet spray, since most plantings showed little or no infestation by midsummer. For this reason, in spite of the fact that oil sprays were used quite extensively against the overwintering flies, very little additional information was gained this season relative to the period

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## FARM FAMILIES WILL APPRECIATE ITS BIG CAR DEPENDABILITY



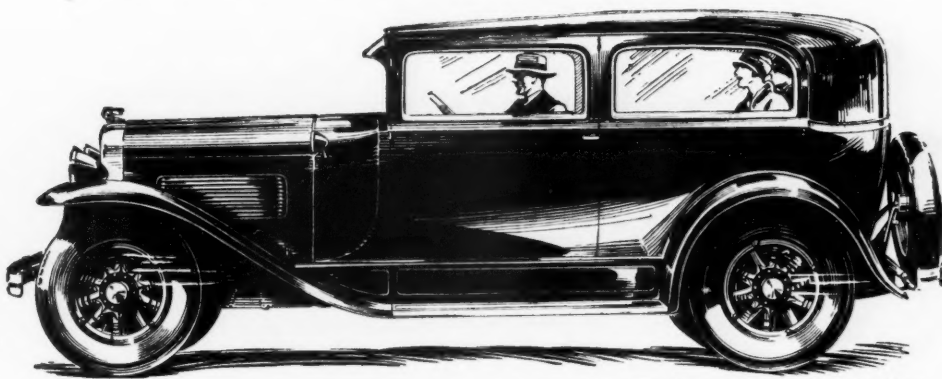
Country driving, day in and day out, calls for more than ordinary stamina in a motor car. And more-than-ordinary stamina is what you get in the New Pontiac Big Six. Its rugged, big car dependability is the kind you can rely upon in good weather and bad—all the year 'round. There's abundant power, too, in its big, sturdy L-head engine—plenty of snug, draft-free comfort in its new luxuriously upholstered bodies by Fisher—extra safety in its new internal-expanding four-wheel brakes, completely

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The New Pontiac Big Six is a real step up car. It is built for people who want something better than they are now driving—something newer, faster, more powerful, more luxurious—something that means a genuine step up in fine motor car quality and which, at the same time, they can buy without leaving the low-priced field.

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## A Bell System Advertisement

A FARMER whose address is Route No. 4, Ft. Atkinson, Wisconsin, was away from home when a stranger drove by. The stranger was from Beloit, fifty miles away. He was interested in a Guernsey cow and calf that he saw in the field, but the farmer's son did not have authority to sell. The next day the farmer got the man in Beloit on the telephone. He sold him the cow and calf—a cash transaction of more than \$200.

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Keep in mind that your ultimate success, measured in profits, will be largely determined by the quality of the stock you plant.

Here's a simple way of insuring yourself against the hazards of inferior nursery stock:

First, turn to page 36 of this issue, to the Advertisers' Index. Under the heading of "Nursery Stock" will be found the names of a number of nursery concerns whom we know to be reliable. Read those advertisements—they contain interesting information for you.

Next, write for their catalogs. A postal card will do, but a letter, tell-

ing approximately what you intend to plant, will be better.

Then, wherever you place your order, you are certain of starting right.

Or, for your convenience, we will do it for you, though it will take a few days longer.

Check below the items in which you are interested and we will forward your request to these nurserymen. Mail this coupon to

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| <input type="checkbox"/> Dewberry   | <input type="checkbox"/> Blueberry | <input type="checkbox"/> Loganberry  | <input type="checkbox"/> Grape       |
| <input type="checkbox"/> Blackcap   | <input type="checkbox"/> Raspberry | <input type="checkbox"/> Ornamentals | <input type="checkbox"/> Fruit Trees |

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Address .....

# The Market Review

By PAUL FROELICH  
United States Bureau of Agricultural Economics

**A**N UNSETTLED condition prevailed in fruit and vegetable markets during the first half of February. Cabbage prices were recovering from a slump; onions were advancing to new high levels, but potatoes showed a considerable weakness following the official report of heavy stocks on hand. Apple prices were holding remarkably steady, except for very slight seasonal advances in some of the important shipping areas. Strawberries had declined sharply from their high opening range. Combined shipments of 21 leading products were averaging 2260 cars daily, or slightly more than at the same time last season.

Severe cold waves had been experienced in the northern and western states, with heavy snow in some sections. Haulings from farm storage were hindered, and trading in city markets was affected to some extent. In the sunny South, citrus fruit was moving actively from Florida and California, but the Texas season was nearly ended. Strawberries were an important feature in Florida, and the berry season was expected to begin soon in Louisiana and other early states.

### The 1929 Outlook Report

During late January, federal officials and numerous state representatives met in Washington for a week's conference regarding the 1929 outlook for various farm products. The following summaries for the leading fruits will be of interest to all growers. Copies of the detailed report can be had from Washington.

**Fruits**—The production of leading fruits in 1928, which was a year of generally favorable weather conditions, amounted to more than 14,000,000 tons. While below the record production of 1926, the crop was about 13 per cent greater than the average production during the preceding five years and 28 per cent greater than the light crop of 1927. As a result of the excessive production in 1928, large quantities of peaches and grapes were not harvested. The marketing of the combined large crops of apples, pears, citrus fruits and strawberries has presented difficult problems. Indications are that fruit production in the United States during the next few years will show a gradual increase from the average of recent years. The outlook is for continued keen competition among the various fruits, and for low prices in seasons when growing conditions are unusually favorable. Imported fruits, particularly bananas, are important in our market supplies. Banana imports have shown an upward trend during the last five years and in terms of carloads have exceeded the carload shipments of apples for the same period.

Although occasional overproduction has always been one of the problems of the fruit grower, the present situation is partially the result of the overplanting of certain fruits during periods of high prices. In some areas planting has also been artificially stimulated by those who had land for sale or were otherwise financially interested. Heavy losses are experienced when an excessive acreage is set to fruit trees, and future market prospects should always be considered by those who contemplate fruit plantings.

Consumers are more discriminating than formerly in their fruit purchases. High-quality fruit of desired varieties sells at substantial premiums over fruit of inferior quality.

**Citrus Fruits**—The 1929 outlook indicates, as did those of the three previous years, a considerable increase in the bearing acreages of grapefruit and oranges. Many trees now in bearing have not reached the age of maximum yield and a large increase over production in recent years may be expected in years when favorable growing weather prevails. Under these conditions price levels below those of recent years may be anticipated. The bearing acreage of lemons has not shown any pronounced change since 1921; a slightly downward trend is now indicated, but production is on a high level and the

industry has been confronted with difficult marketing problems.

**Apples**—Commercial production for the country as a whole will continue at a high level and probably will increase over a period of five or 10 years. The rate of increase is likely to be lower than during the last 10 years, but with the large number of trees now in commercial and small farm orchards the possibility of heavy production and low prices will continue. Over a period of years, however, commercial growers who are favorably located and who produce fruit of high quality at low cost may view the future with some optimism, if plantings in general are confined to those needed for replacement purposes. The future appears to be no brighter than the past for growers whose returns have been low because of poor varieties, or because of poor location with respect either to marketing or to growing conditions. Commercial plantings appear to be justified only where unusually favorable conditions exist for the economical production of good quality fruit.

**Peaches**—The outlook is for continued heavy production of peaches for the next few seasons, whenever weather conditions are favorable. In the South, production for the present cycle is probably near the peak. Extremely heavy production is likely to continue for several years in California, and, until production reaches a considerably lower level in both these areas, continued difficult marketing conditions may be expected. In California the prospective increase in production during the next few years will be in the clingstone (canning) varieties, whereas the production of freestone varieties is expected to decline. In other commercial fresh peach areas, on the whole, recent new plantings have been moderate, and no large increases in production under normal weather conditions are anticipated in the near future.

**Grapes**—Conditions in the grape industry continued unsatisfactory during the past year. Heavy production in the West is in prospect for the next several years. It appears that any probable immediate increase in consumption will be too limited to help in marketing the crop unless aided by an immediate reduction in acreage, particularly in California. The high point of consumption established in 1927 was maintained in 1928, but at much lower prices.

**Strawberries**—Acreage of strawberries in the early and the late shipping states, where there is only limited competition, does not appear to be excessive, and market prospects in those areas are fairly good. The principal trouble with the strawberry situation seems to remain in the second-early and the intermediate states, where acreage and production are still in excess of market requirements. A general reduction of about 20 per cent in commercial acreage in these mid-season sections appears advisable, if returns to growers are to be more favorable than in recent seasons. Further immediate expansion will be particularly dangerous in the Ozark region and in eastern states from Virginia to New Jersey.

### Strawberry Acreage Reduced

Preliminary reports from strawberry growers indicate that this season's acreage for picking will be about five per cent less than last year's total. The figures indicate 194,290 acres, of which 116,000 are in the second-early and intermediate states. An increase of 10 per cent is shown for the early states, with Louisiana having 24,000 acres, or four per cent more than in 1928. The groups of states shipping during the peak of the berry season probably will show a 10 per cent reduction from last year's acreage, and no change is indicated for the late-shipping states. The sharp reduction in Missouri should help the marketing of Ozark berries. On a quart basis, Florida berries were jobbing at the moderate range of 35 to 55 cents. About 110 cars moved from Florida during the first week of February, compared with only seven a year ago.

### Citrus Estimate Increased

As a result of a survey on February 1, the production estimates for Florida oranges and grapefruit were each raised 1,000,000 boxes. These crops are now expected to total 13,000,000 and 9,000,000 boxes, respectively. Commercial shipments of Florida oranges for the season of 1928-29 are forecast at 12,000,000 boxes and grapefruit at 8,000,000 boxes.

About 16,400 cars of oranges had moved from Florida shipping points by February 10, or as many as during all of last season. Shipments after mid-February last year were 4400 cars, but probably will be greater during the remainder of the present season. California had forwarded 15,700 cars of oranges by early February, and was running 4000 ahead of its corresponding record for 1928. Receipts of citrus fruit from Porto Rico have been very light compared with last season's volume.

March 30 has been set as the date on which grapefruit and certain other fruits in Texas must be removed from the trees in the Mexican fruit-worm regulated territory. This is one month later than the beginning of the host-free period in 1928. The grapefruit and oranges this season are ripening later than usual, with the result that not much more than half the crop had been moved by the end of January. Movement from Texas points has already exceeded 1200 cars of grapefruit and 30 cars of oranges. By February 10, Florida had moved 11,000 cars of grapefruit, compared with 8000 the year before and 14,160 during all of last season. In addition, more than 5000 carloads of mixed citrus fruit have left Florida shipping points.

### Apple Markets Nearly Steady

Prices of apples have shown remarkably few fluctuations this season. The story for one week is almost the same as that for the week preceding and the week following. In general, there has been a slightly higher tendency with the advance of the season, but few sharp changes anywhere. Extra fancy, medium to large Winesaps were still ranging \$1.55-\$1.75 per box in shipping sections of the Northwest, with Delicious bringing \$2.40-\$2.65. Best Baldwins and Rhode Island Greenings were holding firmly at western New York points around \$5 or \$5.25 per barrel, while bushel baskets returned mostly \$1.65. City market prices were well maintained, but registered no material changes.

Apple shipments for the present season had passed the 111,000-car mark by mid-February, and it was expected that fully 15,000 additional cars would be forwarded, as compared with 11,000 after this time last year. High records were being established in Washington and Virginia. Washington had already shipped 34,000 cars, with many more to come. About 19,000 cars had left Virginia producing sections, or more than twice as many as during all of last season.

### Supplies Reduced Further

Commercial cold storage houses on February 1 reported 1,681,000 barrels, 12,347,000 boxes and 3,186,000 bushel baskets of apples on hand. Combined cold storage holdings were 29 per cent heavier than a year ago but only five per cent above the February 1 average for the past five seasons. Cold storage stocks of apples in barrels were 39 per cent below average for this time of the year, but were one-third greater than last February's supply. Boxes showed a 26 per cent increase over the record of a year ago and over the five-year average. More than two-thirds of the cold storage supply of boxed apples was in Pacific Coast States and chiefly in the Pacific Northwest. Bushel baskets were 38 per cent more plentiful than on February 1, 1928, and were almost double the average holdings in baskets.

### Foreign Apple Market

Buyers of American apples in Great Britain are beginning to pay a premium for barreled fruit when packed in shredded oiled paper. Considerable trouble was being experienced with scald on some eastern apples which were not protected by this method of packing, and British buyers are now having greater confidence in the oiled-paper packs. A premium of \$1 to \$2 per barrel was frequently paid on the Liverpool auction for clean fruit,

protected by this paper. Red varieties of apples were in strong demand in British markets. Continental apple markets were holding up remarkably well, in spite of severe cold weather which hindered trading.

### The German Prune Market

The Hamburg prune market in late January was rather quiet, due largely to the high quotations on California stock. The Yugoslav campaign is now practically finished. Hamburg prices were slightly higher on the small sizes and slightly lower on the large sizes. Prices on January 28 ranged from \$5.38 to \$5.58 per 100 pounds on 80/85's and from \$4.30 to \$4.38 on 95/100's, as compared with a range on January 12 of \$5.59 to \$5.75 on 80/85's and \$4.15 to \$4.23 on 95/100's.

Imports of prunes, including removals from the Hamburg warehouses for distribution in Germany, during the four months September 1 to December 31, totaled 33,362,000 pounds, as against 12,665,000 pounds during the corresponding period last season. The United States supplied 82 per cent of the imports thus far this season and Yugoslavia 16 per cent. Supplies on hand were considerably heavier than last winter.

(Mich.) Fruit Exchange to its members and their friends on February 15. The exchange has made a practice of entertaining its members annually with a big banquet, but this year it was decided to supplant the banquet with an "old-fashioned" ball. Between dances "Pie Plant Pete" entertained. Some 400 folks attended the party.

The exchange had a good season in 1928 and its financial report shows the usual dividend paid and a nice sum added to surplus. This association was organized in 1915 and has shown a steady growth and is now rated as one of the best in Michigan. Leon Shepard as president, George B. Mechem as vice-president, D. W. Wadsworth as treasurer, and J. A. Barron as secretary and manager were the officers elected at the annual meeting.

### Exchange Holds

### Annual Party

THAT the old-fashioned square dances are still being enjoyed was demonstrated at a party given by the Fennville

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Come in and see these new cars. A demonstration may be arranged at any time suitable to your convenience. An immediate order will aid in early delivery.

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Coupe \$535; Sedan \$595; Roadster \$485; Touring \$475; Commercial Chassis \$365.

#### WHIPPET 6-COACH 7-BEARING CRANKSHAFT

**\$695**

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"We have used Chilean Nitrate ever since we planted our trees and they have made wonderful growth, being at least five years ahead of their age in size; and we have had heavy yields per acre, since the orchards came into bearing. Our McIntosh Red apple trees have not failed to give us a crop every year for the last four years and are set full of vigorous, large fruit buds for the coming season. Of course, some credit is also due to the heavy mulch of meadow hay that is spread under the trees every year; then the Chilean Nitrate of Soda is broadcast by hand on the mulch, so that the trees get the full benefit of the nitrate, instead of growing rank grass."

Parker Brothers,  
Fiskdale, Mass.

A few dollars invested in Chilean Nitrate for your trees will pay a handsome profit. If you do not know how or where to buy it, a letter to the address below will have prompt attention.

## Free Fertilizer Book

Our new 44-page book "How to Use Chilean Nitrate of Soda" tells just how to fertilize Apples and all other crops. It is free. Ask for Book No. 1 or tear out this ad and mail it with your name and address written on the margin.

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In writing please refer to ad No. F-36

# Currants and Gooseberries for Additional Income

By CLARENCE E. BAKER

Purdue University Experiment Station

**THE COMMERCIAL** possibilities with currants and gooseberries apparently is not realized in many communities. Their culture in the home garden, also, should be much more widespread than it is at the present time. Few small fruits are so easy to grow, and both currants and gooseberries are popular with a large number of housewives for jellies and preserves. There are many towns and cities throughout the country near which a small planting of these fruits should prove very profitable.

## Cool Climate and Rich Soil

Both of these fruits are similar in that they prefer a cool climate and a rich, moist soil. They have a sufficient wide range of adaptation, however, to thrive in nearly all sections of the middle western and northern states. Unlike many fruits, they will stand excessively low temperatures without winter-killing, which makes them dependable croppers and insures a yearly income. They prefer a rather heavy soil that holds moisture well and is abundantly supplied with organic matter. Where the soil is light and sandy and the summers hot, success with these fruits is

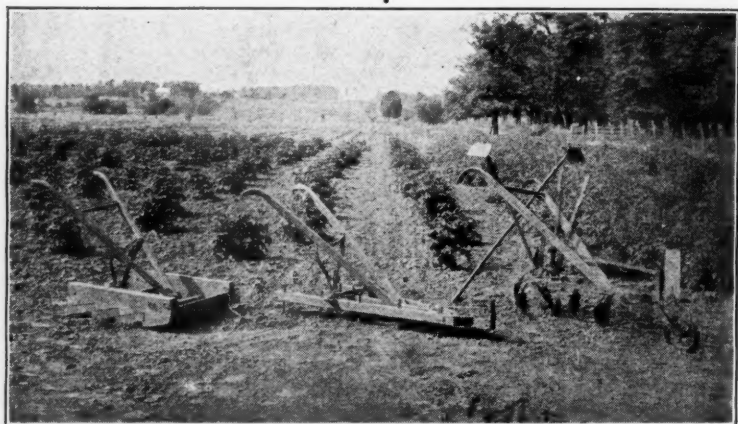
## Practice Clean Cultivation

Cultivation usually is depended upon to kill weeds and to conserve soil moisture. During the growing season the surface of the ground should be kept pulverized. Shallow cultivation that will not disturb the young feeding roots is the best. In late summer after the bushes have made their growth, a cover crop of millet or oats may be sown.

In the small patch or in the home garden cultivation is often inconvenient and the bushes are too frequently permitted to grow in sod. Under these conditions a heavy mulch of straw may be substituted for cultivation. The mulch serves to keep the soil cool and moist and bushes so grown do much better than where they are left to compete with weeds and grass.

## Prune Sparingly

A little pruning of currants and gooseberries is necessary to maintain a healthy, high-yielding plant. Pruning may easily be overdone, however, and the fruit producing habits of the plants entirely upset. In pruning currants and gooseberries it



Common tools used in cultivating the berry field

unlikely. A northern exposure is desirable for the culture of currants and gooseberries, or they may be grown in partial shade, as in an orchard. In the home garden, they may be planted on the north side of a fence, grape arbor, or building.

## Plant Before Growth Starts

The soil should be deeply and thoroughly prepared and well firmed in order that it will settle but little after the plants are set. It is wise to plant in ground that has previously been in a cultivated crop rather than following sod. A heavy application of barnyard manure should be worked into the soil well in advance of planting. If the plants are set in the spring the manure may be applied the previous fall and well worked into the soil.

Both spring and fall planting are successful. The plants lose their leaves and become dormant early in the fall and likewise begin growth very early in the spring. Consequently, fall planting frequently is recommended and is much preferred to late spring planting. In fall planting it is a good practice to protect the plants from heaving out, due to freezing and thawing, by covering with a light mulch of straw. If the plants can be set early in the spring before growth begins, this also is satisfactory.

While the distance of planting should vary with the variety and the fertility of the soil, the common planting distance is about five by five feet, or the plants may be set four feet apart in rows spaced six feet apart. It is usually a poor practice to plant closer than these distances.

The plants should be set a little deeper than they stood in the nursery and the moist, mellow soil firmly packed about the roots.

should be remembered that the greatest amount and highest quality of fruit is produced on the younger wood. Two-year-old wood is in its prime, and four-year-old wood is usually deteriorating. Pruning of the mature plant, therefore, consists in removing the old fruited-out canes each year at the surface of the ground and thinning out the weakest of the young canes, leaving the more vigorous shoots for renewal wood. Eight to 12 strong canes make a well proportioned bush.

As few cuts as possible should be made and any heading back of the annual growth avoided, as this only serves to induce branching, thus increasing the denseness of the bush, which is undesirable.

## Gooseberry and Currant Varieties

The European gooseberries generally are not very productive in the middle west but they are sometimes grown in the home garden, where they are used to furnish ripe fruit to eat out of hand. The American varieties are smaller but much more productive.

Downing and Houghton are the two best known varieties of gooseberries for commercial planting. Some five years or more ago the Poorman variety was introduced, which has indications of becoming a very popular variety. It is a vigorous grower, early, productive, of good quality, and the fruit ships well.

London Market is probably the most satisfactory commercial variety of currant for the Middle West. Diploma, Red Cross and Wilder produce larger berries but usually fall below London Market in total yield.

## Harvesting and Marketing

Gooseberries are generally marketed green, making it easy to handle them after

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Powderpaint is much more efficient than whitewash and 100 per cent cheaper in the long run because it does not rub off, nor wash off in rain storms. In bulk quantities. Powderpaint is sold at reduced prices, freight paid, which makes it very inexpensive.

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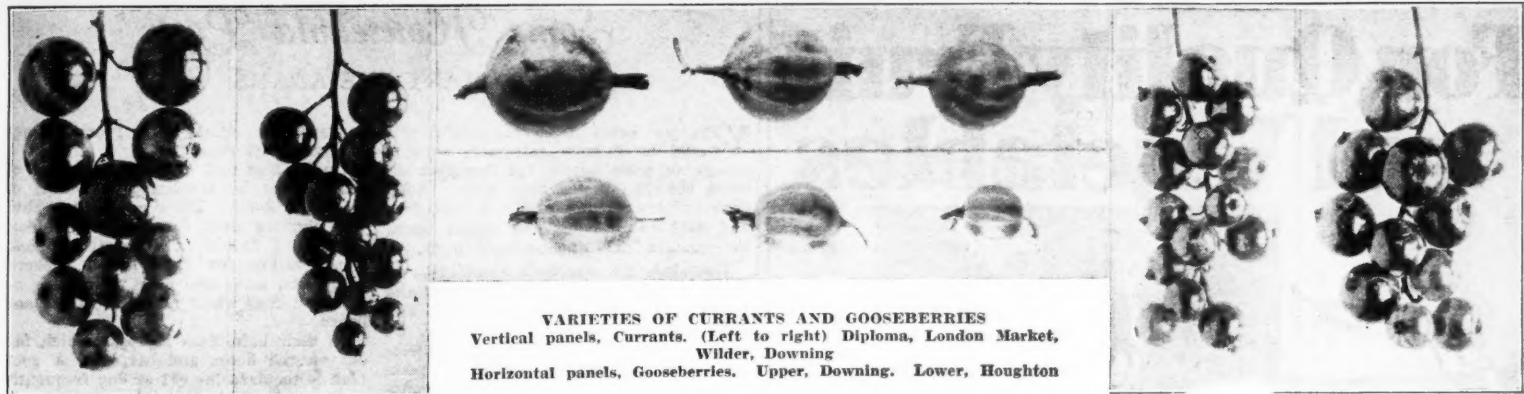
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VARIETIES OF CURRANTS AND GOOSEBERRIES  
Vertical panels, Currants. (Left to right) Diploma, London Market, Wilder, Downing  
Horizontal panels, Gooseberries. Upper, Downing. Lower, Houghton

they are harvested. Picking is a tedious task, however, especially with the more thorny varieties. It is a common commercial practice to strip the fruit from the bushes, leaves and all, the pickers wearing leather gloves. The fruit is then run through an ordinary fanning mill to separate the fruit from the leaves. This greatly reduces the cost of the harvesting. Twenty-four-quart cases are generally used for marketing gooseberries, although sometimes climax baskets or even barrels are utilized.

Currants must be harvested and handled with care if they are to hold up during shipment and reach the market in an attractive condition. Each cluster should be handled by the stem so as not to bruise or crush the fruit. The fruit should be picked when still firm if intended for distant shipment. The 24-quart ventilated crate is one of the best shipping containers for currants.

#### Insects

Four types of insects are more or less common on gooseberries and currants.

The scale which is formed upon the stems may be controlled by a dormant spray of lime-sulphur, using a five-degree Baume strength or one gallon of concentrated lime-sulphur to eight gallons of water.

Leaf-eating worms may be poisoned by spraying the bushes as soon as their presence is detected with one pound of arsenate of lead and two pounds of hydrated lime in 50 gallons of water.

Borers sometimes attack the canes, the small grub-like worms burrowing in the pith of the canes out of reach of sprays. About the only remedy is to cut out the infested canes early in the spring and burn them.

Aphids or plant lice frequently are found on the under sides of currant leaves, causing the leaves to curl and become discolored. If these pests are sprayed before they curl the leaves about them, they may be killed. For this purpose use on fluid ounce of nicotine sulphate to eight gallons of water, adding four ounces of laundry soap. Apply with an angle nozzle in order to spray the under sides of the leaves thoroughly. The insects must be hit by the spray to be killed.

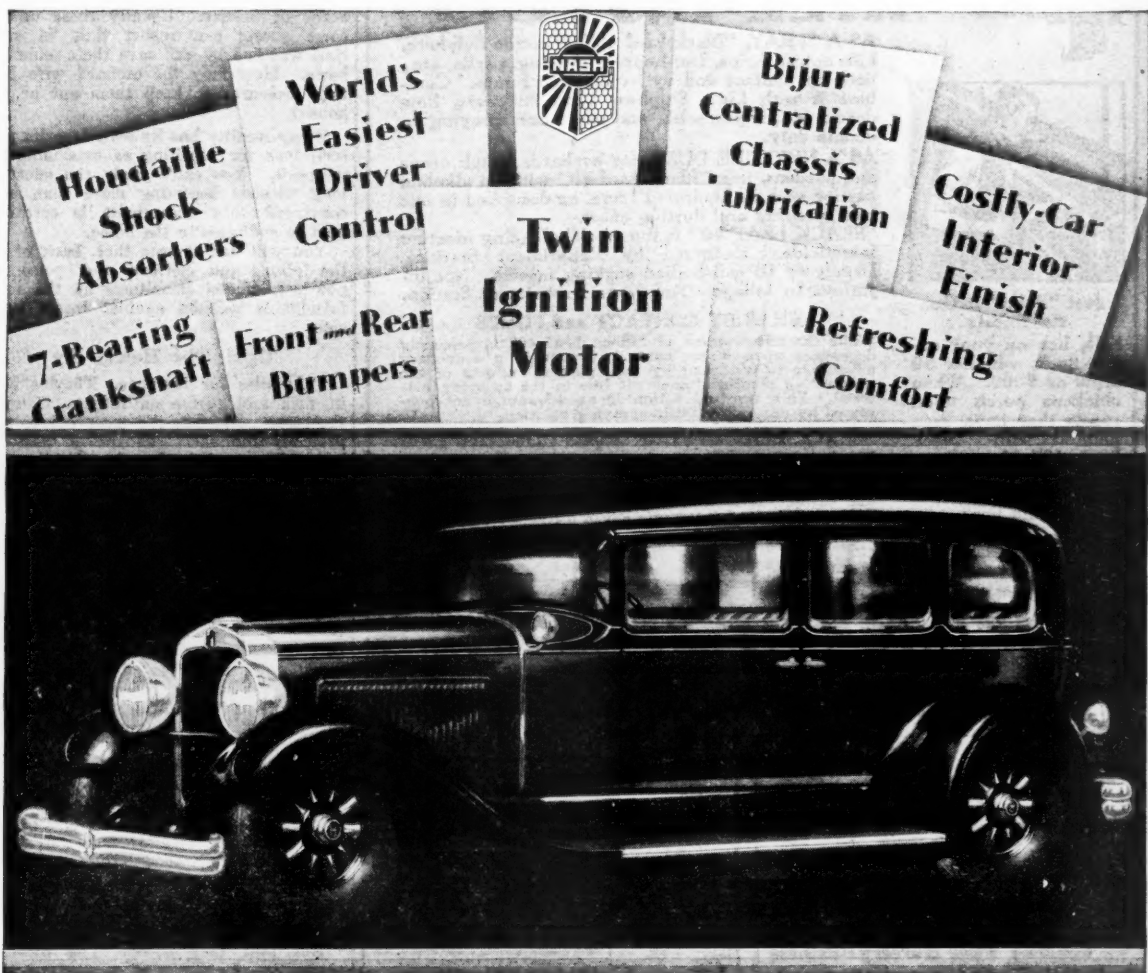
Currants and gooseberries are also subject to several diseases, none of which is serious if the proper preventive measure is followed.

Leaf spots frequently cause yellowing and defoliation in uncared for plantings. Powdery mildew is often serious especial-

ly upon the European gooseberries. Fortunately, these diseases can be controlled by the same treatment, which con-

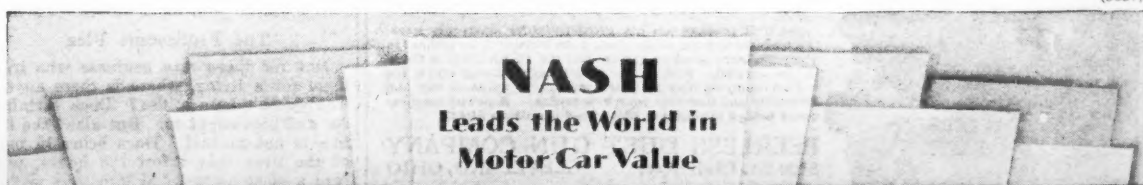
sists of an application of lime-sulphur diluted 1-8 in the spring before growth starts, followed by applications of 1-40

lime-sulphur when the buds begin to burst and at two-week intervals thereafter until late July or August.



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#### Street Car Zoology

A woman in a street car had a small kitten in a box upon her lap.

"You can't carry a dog upon the car," explained the conductor politely.

"But this isn't a dog," remonstrated the woman, "this is a cat."

"It doesn't make any difference," returned the conductor. "The rules of the company must be obeyed."

"But," protested the woman, "that man over there has a large mud turtle."

"That's different," explained the conductor, "mud turtles are insects, but cats are dogs."

Experience has shown that an average windbreak gives a market protection from the wind for a distance equal to approximately 20 times the height of the trees. A windbreak 25 feet high will thus afford protection up to 500 feet.

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"BLACK LEAF 40" is the world's leading nicotine insecticide. Endorsed by Experiment Stations. Deadly to all soft-bodied sucking insects. Non-injurious to foliage. Ask your Experiment Station.

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While the effectiveness of "Black Leaf 40" is primarily dependent upon direct contact (wetting), a secondary advantage is furnished by the "gassing" effects of the penetrating nicotine fumes set free in the spraying material. This two-fold action is an advantage not possessed by any non-volatile spraying solution.

"BLACK LEAF 40" CONTROLS POULTRY LICE  
The treatment requires only a small paint brush, a can of "Black Leaf 40" and a few minutes' time for "painting" the solution on top of the roosts. Easy, effective and cheap. Eliminates all individual handling of birds. Ask your Dealer for information or write us.



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Kills lice on your entire flock, whether 50 birds or 5000. When chickens perch upon roosts that have been painted with "Black Leaf 40", fumes are slowly released that penetrate the feathers and kill the lice.

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The PEERLESS is a sturdy, light-weight, labor-saving machine. It enables you to get better protection against destructive insects and fungi—in a fraction of the time—than you can secure with the best hand-operated liquid outfit. Ideal for diversified fruits, vegetables and many field crops. It turns days of messy drudgery into hours of interesting employment.

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5100 St. Clair Ave. CLEVELAND, OHIO

## Some Household Pests

By MARY LEE ADAMS

YES, we mean *pests*. Household pets would be a more attractive subject, though to some people the line that divides the two seems very hazy. Such grouchy persons lump cats and dogs, fleas and flies, rats, radios and babies under the common title of household pests.

But since the wholesale elimination of all these would leave the house silent and sanitary, but as coldly impersonal and uninteresting as a hospital corridor, we shall confine ourselves to the consideration of a few genuine household pests that are widely scattered over the country and are considered superfluous in any household.

### Clean-up Campaigns

Spring and summer bring a merry horde of insects. Usually these unwelcome guests can report that "a good time was had by all" save their reluctant hosts. How may the orchard wife best take measures to keep them out of her house?

Every locality has its own favorite prescriptions for repelling or exterminating its pests. You can't study the question long without becoming more than ever convinced that cleanliness is certainly next to godliness in the home.

You will find it true that, back of all the lotions and potions and poisonous powders, stands cleanliness as the most formidable weapon against insect invasion.

### Ugh! The Horrid Fly

Take flies for instance. They're born in filth and thrive on refuse. They're the most universal, the most odious and probably the most dangerous pest we have. Due to their obnoxious habits, they carry on their feet the germs of disease. In the popular imagination they are pictured as the little demons of typhoid.

So intensive has been the educational campaign against flies, that it is hard to find a farm house where some precautions are not taken against them. Completely screened houses are not infrequent. Screened kitchens and closely covered garbage pails are general. Every crossroads store furnishes fly powders and sprays and sticky fly paper and nimble swatters. Every rural school instructs the children how to make war on the loathsome fly.

Starvation is the worst punishment we can inflict on flies and every careful housekeeper sees to it that crumbs are promptly swept up, inviting drops of jam or syrup such as children scatter about, wiped away, all food stuffs protected, garbage cans covered and premises kept clean.

### The Source of Supply

But still they come! The breeding places are the source of supply and they breed incessantly. Any accumulation of refuse may serve this purpose but stable manure is by long odds their choice. The proper disposal of stable manure constitutes the chief difficulty with flies on the farm.

The use of gas engines on the farm has done much toward reducing this nuisance, but still it exists. In the busy season, which unfortunately coincides with the fly season, time is lacking for prompt removal of stable manure or for such chemical treatment as may kill the larvae of flies without injuring the quality of the fertilizer. Happy is the orchard woman where the farm animals are kept at a considerable distance from the dwelling.

But, if necessary, flies will travel long distances for food. Experiments made in Texas show that flies which had been caught and specially marked before being released, were recaptured in a fly trap 13 miles away. Eternal vigilance is the price that must be paid for freedom from flies.

### The Frolicsome Flea

But for those rare geniuses who train them for a living, where is there anyone who doesn't hate a flea? Dogs certainly do, and pigs ought to. But alas! the dislike is not mutual. Dogs bring in most of the fleas that infest the house, with cats a close second. Where pigs wallow

and swallow and sleep, the ground is apt to swarm with fleas.

Unlike flies and ants, the presence of fleas cannot be attributed to scraps of food left about. Fleas prefer live bait. The pig, the sleek cat, the beloved dog, you and I furnish a complete well-balanced ration for these blood suckers. Fleas live, move and have their being on cats and dogs which afford them bed and board.

In their hair, fleas lay eggs which fall out on the floors and carpets. A good plan is to place the cat or dog frequently on an outspread paper, brush the eggs, which are very readily dislodged, out of the hair, gather up the paper and burn it.

### Suggested Remedies

Some seriously suggested alleviations of the flea nuisance seem of doubtful value as, for instance, the plan for insuring undisturbed slumber by laying a broad strip of sticky fly paper all around the bed. This might frustrate a man-eating flea, but think how it would invigorate the vocabulary of the man who got out of bed on the wrong foot next morning.

Give the pets a thorough scrubbing in a weak solution of saponified creosote or kerosene emulsion. Give an extra soaking to the head and ears. Cats are even more sensitive to kerosene than dogs, so it may be wiser to use the creosote bath for high-bred kitties, while crude kerosene may be sprinkled over the hardy pigs.

To disinfect the house, scour floors and rugs with soap and water, sprinkle with gasoline and strew naphthalene crystals under the rugs. To destroy breeding places, clean up any accumulations of animal or vegetable matter on the premises, cover the earth whence these have been removed with salt and wet down thoroughly.

Keep animals from under the house. If you must have household pets, you will almost surely have fleas unless you often take considerable pains to avoid them. You can gain relief by the methods described, but if the same conditions are allowed to recur, the fleas will promptly return.

### Our Foreign Ants

Most annoying species of ants in the United States are of foreign origin. Commerce and cargoes of fruit and vegetables have served to smuggle them in. Being more aggressive than our native ants, they have practically exterminated those with which they come in competition.

Again, the sovereign remedy for house ants is to starve them. Cover all food tightly or place it in containers standing in vessels of water. Leave no crumbs about. The ants will lack inducement to enter your kitchen or dining room. But if only one or two discover food, the entire colony is quickly notified by their wonderfully perfect system of communication, and the column begins to file in to the feast.

### Ant Poisons

A number of ant poisons are recommended and may be bought at drug stores. The Argentine ant is one of the most enterprising species. These ants swarm through the house to the consternation of the housekeeper. More than this, they do much damage to fruits, flowers and garden crops.

If a good ant poison is secured, prompt results are obtained by tracing the moving columns to their point of entrance to the house or exit from the earth, and by scattering the poison freely on their line of march. Or it may be set out in containers according to directions. Powdered borax, sprinkled freely along walls and about floors and furniture, has a deterrent effect on some species.

As many insect poisons are dangerous to pets and children, inquiry should always be made at the time of purchase and suitable precautions taken.

"Did you fall?" asked the conductor as he went to rescue a woman who had slipped on the icy pavement.

"Oh, no," she said, "I just sat down to see if I could find any four-leaf clovers."

# Fruit Farm Engineering

By E. W. LEHMANN

## Tractor Costs

**MAKE** the greatest possible use of your tractor in 1929 if you would lower its cost of operation. A study of the costs of operating tractors on 175 New York farms made by C. W. Gilbert of that state showed that on the average it cost 85.7 cents an hour to operate a tractor, not including the operator's time. The important fact is that while on farms where the tractor was used less than 200 hours during the year, the cost of operation was \$1.37 an hour, on those farms where the tractor was used more than 600 hours during the year, the cost of operation was only 0.638 cents an hour.

Under average conditions, where the cost is 85.7 cents an hour for operating the tractor, the fuel costs about one-third of the total. Mr. Gilbert found that the depreciation amounted to 36.18 per cent, fuel 32.9 per cent, interest 9.62 per cent, lubrication 9.43 per cent, repairs and mechanic's labor on repairs 6.04 per cent, and miscellaneous costs amounting to 5.83 per cent. For greatest economy in operation, the cost of the fuel should represent a much larger part of the total. Greater economy can be secured only by using the tractors more hours.

It is quite evident that the farmer who has a small place and has relatively few hours of service for a tractor will find it much more expensive to own and operate than the man who has a larger place and can find more uses for it.

While the studies referred to show that plowing and fitting the land for crops constituted the major part of the work done by tractors, belt work accounted for 22.8 per cent of the total. It is essential that the tractor be kept busy throughout the working season for the most economical results.

Economy in tractor operation will always be influenced by the completeness with which this type of power fits into the farming business. It must displace other types of power, or the business must be expanded for the greatest economy. Mr. Gilbert found that the tractor has displaced the largest number of horses on those fruit and crop farms with a large amount of field work. The effect is less apparent on dairy farms where the acreage of land in tilled crops is small. Horses have not been displaced to any great extent in the lighter and more rapid operations of cultivating and haying, but the effect is marked in plowing, harrowing and disking. On fruit and crop farms studied, tractors have replaced from 2.8 to 4.7 horses on the average, but only 1.3 horses were displaced on the average dairy farm studied.

The cost under New York conditions checks quite closely with costs in other parts of the country. The cost of operating a two-plow bottom tractor on the Illinois experimental farm amounted to 81 cents an hour. Too much attention cannot be given to the matter of adjusting the power and equipment to the farm to secure greater economy in production.

## Some Uses of Sheet Steel

**MANY** new uses are being found for sheet steel on the farm, as well as in the industries. The modern hotel has its rooms equipped with steel tables, dressers, chairs and beds. The office of the business man of the city is equipped with steel desks, files, fireproof cabinets, steel chairs, and the window sash and frames are made of steel. With the increasing cost of lumber, steel will come into more general use on the farm, in the home and in the factory.

Many factory buildings are now made entirely of steel. The walls and roof are supported by a steel frame, and the entire building is fireproof. Store buildings, cottages, oil stations, garages, and farm buildings of many types are being made of steel. The concrete worker uses forms of steel to make possible a better job of concrete work.

Little wood is now being used in the construction of our farm machinery. Sheet

steel is now being used where wood was used a few years ago.

Each year finds new uses of steel on the farms of our country. Steel was first used on farms for roofing purposes. It is now being used for complete granaries, corn cribs, silos, fruit packing houses, garages, watering tanks, machinery sheds, poultry and hog houses, equipment, and other uses too numerous to mention.

## Passing of the Summer Kitchen

**THE VALUE** of a summer kitchen has been questioned by the home management specialists. On many farms a summer kitchen is an established institution. As a result, as the spring days approach, moving day will be with us. Stoves, cup-

boards and cook tables must all be moved to the summer kitchen, and the winter kitchen will then be used only on special occasions.

In an article from an Ohio agricultural extension publication, Miss Geneva Bane points out that it would be better to completely equip one permanent kitchen, and use the summer kitchen for only the few meals during the summer when a large group of people are being fed. This appeals to me as a wise suggestion. Why have two work shops, neither of which is entirely satisfactory? One kitchen, provided with a sink and drain, with hot and cold water, a satisfactory range, cupboards, cabinets and refrigeration equipment, and properly lighted, would be much better than two kitchens, neither of which is completely equipped.

The need for a large kitchen, or a summer kitchen, is not as great on the farm as formerly. This condition is due to the coming of better machinery and equipment with which to do the farm work, and fewer people are needed to do the work.

The electric range, and the modern kerosene and gasoline ranges, make it possible for the farmer's wife to do the

cooking with the same degree of comfort as the housewife in the city home, and when the house is equipped with a modern heating system, the use of the coal range can be discontinued for both summer and winter. With the going of the old hot cook stove, the need of a summer kitchen is largely eliminated.

## Spray Residue Removal

**IT WOULD** be well for those interested in the removal of spray residue from apples and pears to send for a copy of Circular No. 59-C, "Removal of Spray Residues from Apples and Pears in the Pacific Northwest," just issued by the United States Department of Agriculture, Washington, D. C.

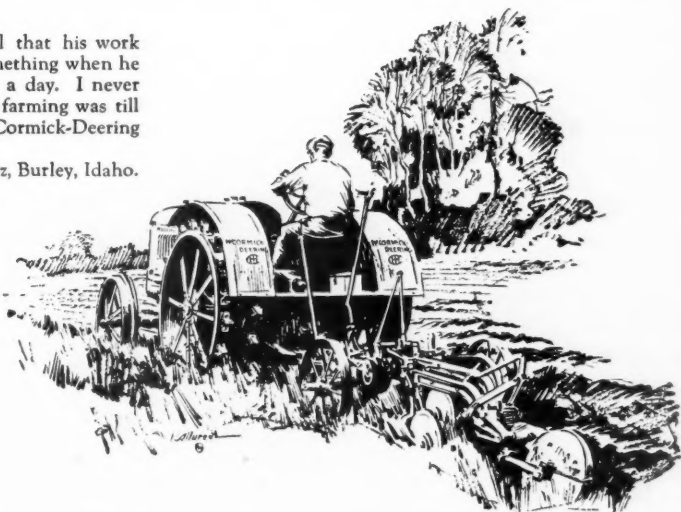
Various methods of removing spray residues from apples and pears in the Pacific Northwest have been studied by the department at Wenatchee, Wash., and by the state agricultural experiment stations of Oregon and Washington. As a result of this work and of commercial experience during the past two years suggestions have been formulated for future procedure. These are discussed in the circular.

"One can feel that his work amounts to something when he plows 15 acres a day. I never knew what real farming was till I got my McCormick-Deering 15-30."

Wm. V. Lutz, Burley, Idaho.

"I used to keep 24 head of horses and mules to farm 260 acres of wheat. Now, with my McCormick-Deering 15-30, I farm 400 acres with one team and no help except at harvest."

Henry Weirauch,  
Pawnee Rock, Kans.



## The Powerful McCORMICK-DEERING will multiply your opportunities

**THE 15-30 h. p., 3-plow McCormick-Deering tractor makes extra money for its owner all along the line. It will save you a lot on costly labor charges because its extra power puts more profitable work in one man's control. It will enable you to plow, till, cultivate, harvest, etc., faster, better, and with less expense.**

The large-size liberally-powered McCormick-Deering will give you more time to handle your live stock to greater profit and advantage. It will enable you to do outside road or custom work or you can increase your acreage and put the extra power to

work on new fields and bigger crops. Being a fast worker, the 15-30 completes the work on hand at a fast rate and gives you more time to enjoy life.

When you buy your tractor, invest in power ample for your peak loads and future needs. Get the tractor built for many years of reliable service; built to deliver liberal, steady power in belt, drawbar, or power take-off work. Buy a McCormick-Deering 15-30 and have power in reserve!

Besides the 15-30 there are the McCormick-Deering 10-20, and the celebrated, all-purpose, row-crop Farmall.

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**McCormick-Deering 15-30**

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## This Hose withstands Chemicals, Oil Emulsions—and High Pressures

**G**OODRICH High Duty spray hose has an oil-proof, chemical-proof tube, that resists the action of oil emulsions and spray solutions used by the big orchard men.

The special construction of Goodrich High Duty spray hose enables it to handle the high pressures called for by modern equipment, including stationary outfits.

The tough cover stands up under the dragging and kinking that hose has to stand for under your own conditions.

Ask the dealer for Goodrich High Duty spray hose.

**IMPORTANT:** You can buy Goodrich High Duty spray hose in long lengths—up to 500 ft.

## Goodrich Spray Hose

**Protects** ORCHARDS  
VINEYARDS  
SHADE TREES  
Against Climbing Insect Pests



**T**REE Tanglefoot prevents all climbing insects from reaching the upper parts of trees and grapevines and destroying foliage and buds. This harmless, sticky, tree-banding compound is especially recommended for combating Canker Worms, Climbing Cut Worms, Ants, Bag or Basket Worms, Tussock, Brown-tail and Gypsy Caterpillars.

For best results band fruit trees, shade trees and grapevines before May 1st. To protect against Canker Worms bands should be applied right now.

Tree Tanglefoot remains effective three or four months—10 to 20 times as long as substitute materials. No mixing is required. Apply it easily with a wooden paddle. One pound makes 15 lineal feet of band. For waterproofing tree crotches, cavities and wounds this product has no equal.

Leading horticulturists almost everywhere endorse Tree Tanglefoot. It is sold in 1, 5, 10 and 25 pound containers at seed, hardware and drug stores.

An interesting booklet  
on insects sent free

**THE TANGLEFOOT COMPANY**  
Grand Rapids Michigan

# TREE TANGLEFOOT

## Fruit Farm Poultry

By RALSTON R. HANNAS

### Start the Chicks Right

**T**HE KIND of care the chicks get during the first two weeks of their lives affects to a very large extent the kind of growth they will make during the brooding and growing periods. First of all, the brooder house must be thoroughly cleaned and disinfected, with fresh, clean litter on the floor, before the chicks are put in. In fact, the stove or oil burner must be set up several days before the chicks are expected and it must have been running at the proper temperature, between 98 and 100 degrees, for at least one whole day before the chicks are put under it. The purpose of this is to make sure in advance rather than when it is too late that the brooder will run satisfactorily.

A circle of some sort should be placed around the brooder at a distance of about a foot from the edge of the hover. The purpose of this circle is to keep the chicks from wandering too far from the source of heat. When they go too far away, they are sometimes not able to find their way back to the heat readily and become chilled. This circle can be made of inch mesh poultry wire about 12 to 18 inches high, or it can be made of felt or fibre building board or cardboard. If it is made of something solid, such as one of the materials just mentioned, it will also protect the chicks from floor drafts, which is an important thing, especially in the early stages of brooding. For that matter, feed bags may be placed over the wire circle when one of the solid materials is not available. This will also protect against drafts.

The litter may be peat or alfalfa chaff or clover chaff that is largely leaves and not dust, or it may be cut straw. The peat litter is becoming very popular for brooding because it absorbs moisture readily. This is a big point in its favor because a dry litter helps to prevent the spread of disease. Disease, especially coccidiosis, spreads easily in a damp litter. There should be from an inch to an inch and a half of litter on the floor. The litter will also help to keep the floor warm.

It is necessary for chicks to have something to drink as soon as possible, and there should be plenty of drinking pans or fountains available for them. At least four pans or fountains are needed in every pen of 300 chicks. Milk or water may be given in these fountains right away. Milk is preferable to water—in fact, many poultry keepers give nothing else to drink for the first two or three weeks but milk. After that time, milk and water are both given, if milk is still available for the flock; if not, water may be given alone by this time. Milk in some form, liquid milk, buttermilk, semi-solid buttermilk, milk powder or buttermilk powder in the mash, should most certainly be included in the ration. It is unwise to try to brood chicks without some form of milk.

The brooder is now ready for the chicks. With the circle described above in place around the brooder, the chicks may be placed under the hover. This circle should be kept in place for the first two or three days until the chicks get to know where the heat is, and after this time, it need only be used at night, and then only for about the first 10 days or two weeks.

No feed should under any circumstances be given the chicks for at least 48 hours after they are hatched. Some people even wait until the chicks are 72 hours old before feeding. If feeding is commenced too early, the chick's digestive system is thrown out of order and trouble starts right away, bowel trouble and pasting up behind. Once a feeding disorder starts in a flock, it does not clear up immediately.

The way in which the chicks are to be fed depends upon the kind of feed that is to be used and the particular system that is to be followed. If commercial feeds are to be given, it is best to follow the directions of the company that makes the feed. A reliable company knows exactly

what is in the feed, how it is made and how it should be fed. Furthermore, there is what is known as the grain and mash system, in which a starting mash is kept before the chicks all the time and is supplemented by a grain feed; the starter is later changed to a growing mash. Then there is what is known as an all mash feed, which consists of a granular mash—coarser than the fine starting and growing mash of the other system—that is kept before the chicks all the time right from the start.

Where a grain and mash system of feeding is practiced, it is wise to get the chicks started on the grain by having a newspaper or board on the floor and feeding the grain on this paper or board for the first few days until the chicks get to know that the grain is being thrown down for them to scratch for. The use of paper or board may then be discontinued.

Especial care must be exercised in keeping milk or water pans clean; it is a good plan to scrub them out with hot water once a day. It is also a good plan to set these pans on slightly raised platforms so if any water or milk is slopped over it will not fall in the litter, causing a damp floor and sometimes a moldy spot under the place where the pan is set.

It must be remembered that a definite system of caring for the brooder and chicks must be established right from the start: there must be a regular time for feeding, caring for the brooder stove or burner, cleaning, etc. It is always wise to look at the flock before retiring to see that the brooder is running satisfactorily and that the chicks are spread out in a uniform ring under the hover. On a particularly windy night, if brooding is being done with a coal stove, it is a good plan to look at the stove late at night to make sure that the draft is not forcing the fire up too high. Too high a temperature under the hover is just as bad as too low a temperature.

### For Healthy Chicks

**H**EALTHY CHICKS are not only the result of healthy breeding stock and an approved method of feeding. Other things enter in. The New Jersey Agricultural College has listed several points that are of importance in maintaining health in the flock. Among them are, keep brooder houses clean by carefully scraping the floors, sweeping the walls and ceiling as well as the floor, and thoroughly spraying with a good disinfectant. Another is to provide clean range or close confinement. Clean range means range on which no chicks have been raised for at least a year and on which no poultry manure has been scattered for at least two years.

If clean range cannot be had, the birds should be confined indoors. Another point is to keep old and young stock separate in order to prevent the spread of a disease known as coccidiosis and to prevent roundworms. Birds must not be kept confined unless careful cleaning and disinfecting are done at least once a week and cod liver oil is fed in the chick growing mash. Everything must be kept scrupulously clean.

Building a screened manure pit will also help to prevent worm infestation, while one and one-half inch mesh poultry wire stretched just under the roosts and over the dropping boards will prevent the birds from walking on and scratching in the droppings and will thus prevent the spread of disease germs. Cleaning dropping boards daily will be an added step in the direction of cleanliness and health, both in the houses where the growing stock is and in the laying houses.

### Also a Transformer

Lady on Interurban—Oh, conductor, please stop the car. I dropped my wig out the window.

Conductor—Never mind, madam, there's a switch just this side of the next station.

## There's a Right Way to Plant and Prune Fruit Trees

(From Page Six)

stakes several feet in length should be driven into the ground at each end of the line. If the row is long or the land uneven one or more stakes may be needed between the end stakes. These are placed by sighting over the two end stakes. The distance between the trees is then measured off and the small stakes driven down to mark the place where each tree should be planted.

Lines running at right angles to the base row are staked out in the same manner. Where the field is irregular in shape it may be more convenient to stake out a square or rectangular block, after which the remaining irregular portions of land can be marked out. Where the field is large, it is usually advisable to use several stakes in locating the cross rows. Tall stakes should be provided at right angles to each other over which to sight in aligning the trees as they are planted.

A less accurate method of laying out the orchard is by plowing furrows. Measurements are made and tall stakes driven at the ends of the lines and between the end stakes whenever they cannot be seen readily. Furrows are plowed at right angles to each other by following the lines of stakes. The trees are then planted at the places where the plow furrows cross. If the soil has been well prepared, it should not be difficult to prepare the holes for the tree roots.

### Preparing the Trees for Planting

In preparing the trees for planting, all portions of roots which have been mutilated in digging or handling should be removed with the pruning shears. Where long, slender roots appear, they should be cut off to about the length of the general root system for that particular tree. The larger and more vigorous the root system, the better the tree as a rule.

Making holes for planting young trees is a simple matter, if the land is well prepared. In general, the hole should be large enough to receive the roots without bending them from their normal position and deep enough to allow the trees to stand from two to three inches deeper after planting than they stood in the nursery row. This is to prevent the roots from becoming exposed through washing of the soil, or subsequent cultivation of the orchard.

In transplanting trees, it has been found that the roots of established fruit trees spread laterally to much greater distance than do their branches. Often the roots of the older trees permeate the soil prepared for the replant before the end of the first season. This emphasizes the need of frequently cutting back the roots of the surrounding trees while tilling about the replant until it becomes well established.

The roots should be set so as to stand in their normal position. Avoid twisting or bending them. Bending a main root greatly lessens its capacity to take up water and prevents it from making a normal growth. The roots may be kept in their normal position and the soil compacted about them by observing the following suggestions: Shake the tree vigorously with one hand while the earth is being shaken from the shovel with the other. In this way the soil sifts among the roots instead of bending them down, as will be the case if the soil is scraped in the hole in masses.

In setting, the soil should be tramped firmly about the roots from the bottom of the hole upward, with an inch of loose soil spread over the tramped surface to prevent the soil from baking and drying out. Much of the mortality of fruit trees is due to bending the roots and failure to compact the soil about the roots in planting. Each layer of soil shaken in should be tramped firmly, from the bottom of the hole upwards. It is impossible to properly compact the soil if the hole is filled before it is tramped.

The use of dynamite in making the tree holes and to shatter and loosen the soil has been investigated by many stations. In general, the practice has not

resulted in any advantage to trees. This has held true in tight, impervious subsoils known as hardpan and in looser and more friable soils. In clay subsoils, a little wet at time of dynamiting, distinct harm may be done by plastering the clay together in such a way as to form a cavity or pocket which may not allow good water drainage. In such instances trees are often killed due to a lack of proper drainage, in wet weather. The soil and subsoil should always be dry enough to work properly before dynamiting. Tight, impervious soils which are said to require dynamiting are generally unsuited for an orchard. What is most needed in the preparation of the land for an orchard is thorough, deep plowing and tillage, such as is given the soil in preparing it for a good truck crop or grain crop.

### Make Orchard Record

An orchard record should be made for each plot of ground soon after the trees are planted. Since this is to be a permanent record, the notes and data should be kept in a book especially prepared for the purpose or in some other form well adapted to such needs.



## Agents Wanted

### South Haven The Peach Supreme

is one of the *proved big money makers* of the fruit field.

### Read What Experienced Authorities Say

From "The Rural New-Yorker," October 29, 1927, in which H. B. Tukey of the Geneva Experiment Station, writes:

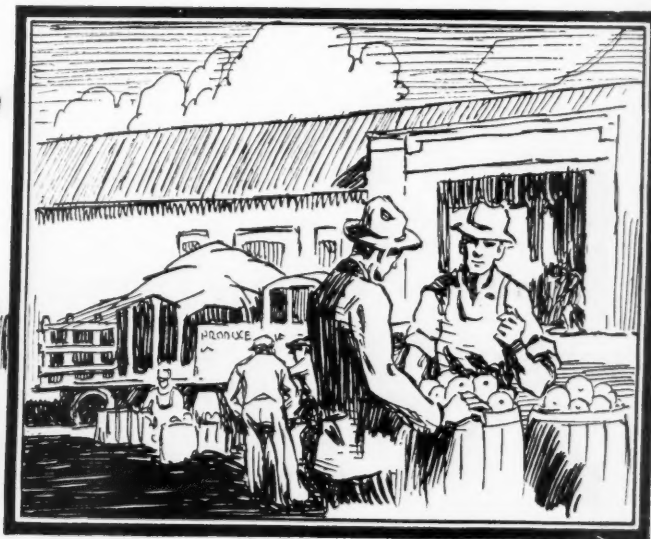
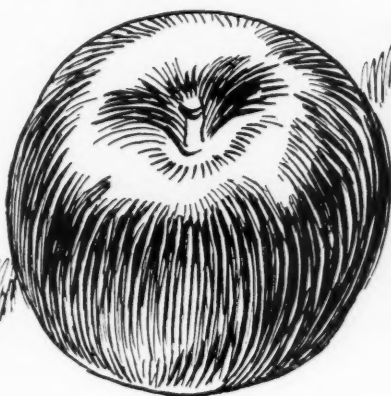
"Many growers have been waiting to see how the South Haven peach behaves in New York State. It has fruited in several localities this year, and has proven all that the introducers claimed for it. It is a few days later than Rochester, larger, brighter and more attractive, and of delicious flavor. South Haven appears to be a worthwhile acquisition."

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### GROW "FANCY" FRUIT



In a season of overproduction **QUALITY** is the only saving asset. "Fancy" fruit commands a market. Watch for the newest advice on pest and disease control. Let the responsible manufacturer help you out with his specialized knowledge. Our Service Department may have just the hint you've needed to make your spraying and dusting count for more.

If you've a pest or disease problem, let us help you. Or, for general guidance, you may want us to send you the new 1929 "Cash Crops."

### ORCHARD BRAND Quality Insecticides and Fungicides

Lime Sulphur Solution  
Oil Emulsion  
Bordeaux Mixture  
Arsenate of Lead  
Calcium Arsenate  
Arsenite of Zinc  
Ditomic Sulphur  
Sulphur Dusts  
(with and without Arsenicals)



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## BLOW this HORN OF PLENTY in your orchards

IT is no myth, nor magic—but proven scientific fact. When you blow Kolodust into your trees, you pave the way for healthier, more abundant fruit.

It is far more effective than mere ground dusts, and the quickest, most economical method of fruit protection.

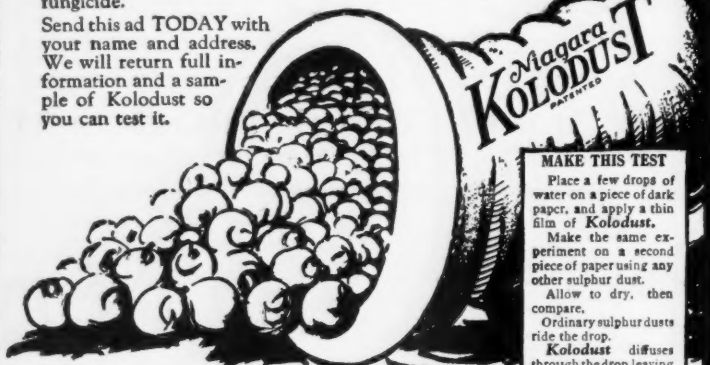
### WHAT IS KOLODUST?

Kolodust is an improved sulphur fungicide. Its essential ingredient is produced by a fusion process which results in a new, patented material displaying colloidal or soluble properties and consists of sulphur in a new form which is fused with a carrier and is invisible even under the ordinary high power microscope.

This new form of sulphur has proven toxic properties far more powerful than any other known forms of sulphur with which it has been compared. It "sticks through rain and wind", thus prolonging the protection period.

KOLOKIL is Kolodust with poison added—an insect-fungicide.

Send this ad TODAY with your name and address. We will return full information and a sample of Kolodust so you can test it.



Made by  
**NIAGARA SPRAYER and CHEMICAL CO., Inc.**  
142 Elizabeth St. Middleport, N. Y.

#### MAKE THIS TEST

Place a few drops of water on a piece of dark paper, and apply a thin film of Kolodust.

Make the same experiment on a second piece of paper using any other sulphur dust.

Allow to dry, then compare. Ordinary sulphur dusts ride the drop.

Kolodust diffuses through the drop leaving a protecting film over the entire area. Send for demonstration sample.

## Spray Notes from the Stations

(From Page Eleven)

of protection afforded by a single application when conditions are favorable for superabundant numbers of the pest. However, opportunity was afforded of noting the reactions of the overwintering flies to oil-treated trees. It was clearly demonstrated that if the application was thorough and was made before eggs were laid, the oil coating acted as a deterrent to oviposition. Striking differences in this respect were discerned between trees and orchards sprayed with oil as compared with plantings where the treatment was omitted. In the case of old, weak trees, especially those which sustained severe injuries as a result of the heavy infestation during the preceding year, and which had been sprayed with oil for two or three years previously, the oil treatment caused injury, occasionally of an important extent, while young trees and trees in a vigorous state of health exhibited no outward ill effects.

In view of the difficulties experienced in fighting the psylla, growers are strongly tempted to use an oil spray against the overwintering flies and there is little doubt that many will resort to this treatment during the spring.

In this connection, it should also be noted that owing to the increased destructiveness of the leaf roller in certain apple growing areas an application of a lubricating oil emulsion containing from six to eight per cent oil, according to degree of infestation, is contemplated by not a few growers this spring in an effort to check the hatching of the eggs.

### Recent Developments in Spraying Practice

By W. C. DUTTON  
Michigan State College

THE SPRAYING PRACTICE of any district is something that does not seem to vary greatly from year to year. However, investigation and experience usually show us that slight changes in practice are possible and desirable nearly every season and occasionally some major change is made. These changes may be in the timing of the applications or in the materials used and are made because of new information concerning the life history of the pests or because some more effective or safer material has been discovered or developed.

It is the purpose of this discussion, which is supplementary to the spraying schedules for Michigan, in the February issue of the AMERICAN FRUIT GROWER MAGAZINE, to point out and explain any changes in practice, in timing of applications or in materials that are advised for the season of 1929. The introduction of new insects or the increase of some that have long been with us makes necessary some change of emphasis with regard to certain schedules, and the acquisition of additional information concerning materials has resulted in more restricted use in some instances or of greater adaptability in others. This discussion can probably best be taken up separately for each of the major fruits.

#### The Apple

The dormant application had rather gone out of style so far as the apple in Michigan is concerned but the advent of the European red mite and the increase of the fruit tree leaf roller has made some change in this respect. Both these insects are best controlled with oil sprays. The oil sprays have been used many times in the delayed dormant period without injury, but the fact that some of the oils have caused severe injury when used at that time, coupled with the fact that oils do not give consistently good control of aphids, makes it seem advisable to limit the use of oil on the apple to the late dormant period.

Scale insects may be controlled by the use of an oil emulsion (using two to three per cent actual oil) or with a miscible oil according to the manufacturer's instructions. If red mites are present, use a three to four per cent dilution of an emulsion or a miscible oil according to the manufacturer's recommendations. This will also control the scale insects. The fruit tree leaf roller has developed into a

really serious pest in many orchards and its control is not easy to accomplish. The best known treatment consists of a late dormant application of an oil emulsion diluted to give eight gallons of actual oil in every 100 gallons of spray. The miscible oils vary greatly in their effectiveness and of those available in Michigan there is only one, so far as the writer knows, that has proved satisfactory for leaf roller work.

The proper period for the application of the leaf roller spray is in the late dormant period after the buds begin to swell but before any green tips appear. Spray very thoroughly from the ground and, if necessary to reach the tops of the trees, a second operator should work from the top of the sprayer or from a tower. The spray for red mites is best made at this same period, and the leaf roller treatment will, of course take care of mites and scale as well. If leaf rollers are not present, the concentration of the oil should be lowered. In addition to spraying with oil for leaf roller, it is desirable to remove and burn all prunings before spraying, and as an added precaution, band the trees with tree tanglefoot to prevent the newly hatched nymphs from crawling up the trees from any egg-bearing twigs or spurs that may be on the ground. Lead arsenate in the prepink or pink spray is valuable as a further check, although arsenicals alone cannot be depended upon for control.

The best and surest control for the rosy aphid and the early brood of the green apple aphid is a delayed dormant application of lime-sulphur two and one-half gallons, nicotine sulphate one pint, and water to make 100 gallons. Apply very thoroughly and complete each tree, or at the most, each row as a unit, before going to the next. The prepink is the very latest period when satisfactory aphid control can be accomplished. There is no way known to predict aphid infestation and the use of aphid control measures must be determined entirely by previous experience. If injury has occurred often enough to be of importance, the use of nicotine sulphate and lime-sulphur should be practiced every year regardless of current indications for aphid development.

The use of oil sprays is not advised in the delayed dormant, or at any other time for aphid control. Summer infestations of green aphids should be treated with nicotine sulphate.

For orchards where foliage injury has been severe, the use of a modified lime-sulphur for part of the applications and of Bordeaux for one has been found to result in much better foliage and other things that go along with good foliage. For the prepink, pink, petal-fall and the two-weeks sprays, use the modified material, directions for preparation and use of which appeared in the February issue.

For the second brood spray, which usually comes about August 1, use Bordeaux 2-2-100, with two pounds lead arsenate for each 100 gallons of spray.

#### Pears

The most important points to mention in connection with the pear schedule have to do with psylla control. The use of the early dormant oil treatment seems to be the best procedure for the control of psylla. It should be emphasized that this should be applied with the first weather in early spring that is suitable for spraying. Any delay usually results in egg-laying before the spray is applied.

For the control of psylla during the summer where the dormant oil has not been fully effective, the use of a "summer oil," which is an emulsion made up from a highly refined oil, gives promise of being valuable. The use of this treatment is not entirely understood, but excellent results have been obtained in many instances from the use of a two per cent spray of this type of emulsion. This is probably best applied when the psylla begin to appear in late June or during July or even during August.

#### Cherries

No radical changes have been made in the cherry spraying practice but it seems advisable, where leaf spot has become established and conditions are favorable for its development, to increase the amount of lime-sulphur from two and one-half to three gallons in each 100 gallons of spray.

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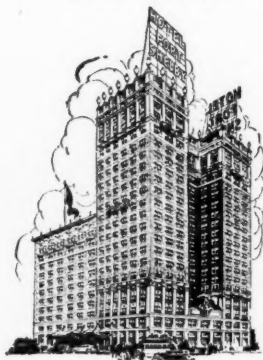
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The shortening of the period between applications and probably a fourth spray before harvest seems advisable under epidemic conditions.

### Peaches

The item of greatest importance in connection with peaches is the problem of arsenical injury, which has been very severe during the season of 1928. We do not know of any procedure that can be guaranteed to eliminate this injury, but the observance of a few precautions will undoubtedly help.

1. Use the minimum number possible of applications of lead arsenate. Some orchards may need none, in others the one made as the shucks fall is ample, and two applications should be considered as the maximum.

2. Use not more than two pounds lead arsenate for each 100 gallons of spray, and not more than five per cent in dusts.

3. Always use lime with lead arsenate. For dusting, use five per cent lead and 95 per cent hydrated lime for the shuck application and an 80-5-15 sulphur-lead-lime mixture for the next. For spraying use two pounds lead arsenate and 10 pounds lime for each 100 gallons for the shuck fall spray, and for the next, when dry-mix is used, add eight pounds hydrated lime to each 100 gallons. With wettable sulphur, add 16 pounds lime for each 100 gallons.

4. Dust and spray carefully and thoroughly to insure proper coverage, but never use a heavy application on peaches of a dust or spray containing lead arsenate.

Many growers need, in rainy seasons, to give more attention to the control of peach scab during mid-summer, possibly making extra applications of sulphur dust or spray on susceptible varieties during July or August.

### New Phases of

### Orchard Ailments

By L. S. MORRIS

Brigham Young University

**A**MONG the new phases of orchard ailments in the Rocky Mountain area are winter injury and gummosis of peach and cherry trees.

### Winter Injury

Although winter injury is as old as the fruit industry in this region, it has been the cause of recent agitation. As a matter of fact, the after-effects of the severe winter freezes of 1924-25 have often been misinterpreted for something else. Reports of an unidentified disease of fruit trees are frequent, and in most cases diagnosis reveals the cause to be winter injury. Especially is this true of sweet cherries, peaches and apricots which are considerably less hardy than the apples. Perhaps most of the trouble can be traced back four years when, in many localities, the temperature went down to 30 degrees Fahrenheit below zero, and in a few places to 35 degrees below. Growers in general thought that they were through with the trouble when they pulled many of their trees up. Those trees which were not injured to the killing point may have lived over for one, two, three or even four years. Perhaps some shall die next year because of lagging vitality, initiated four years ago.

This particular freeze is not the only one, however, that is causing damage to trees. It is a common practice for many growers to plant an intercrop of sugar-beets, potatoes or something similar in their young orchards. A late maturing intercrop necessitates late irrigations, which in turn stimulates late growth in the young trees. When most fruit trees continue growth later than the first of September, they are almost certain to suffer some winter injury. In some cases peach trees have been killed outright because of moderate winter freezing of immature wood. A specific case will serve to illustrate: A grower near Provo complained of a sickness which struck one-half of his peach orchard. Most of the leaves did not come out in the spring of the year, and those that did, lacked strength. He responded to a series of questions that the half which was so badly injured had sustained a crop of sugar beets the previous year, and that the beets had been irrigated once every week until after the middle of September. It was also his practice to cultivate



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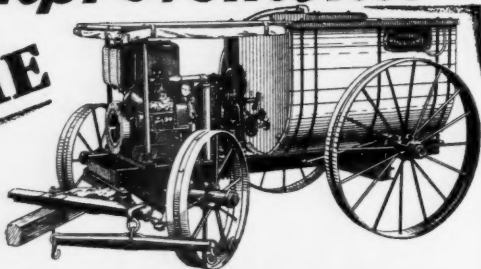
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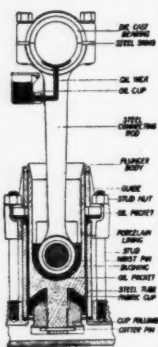
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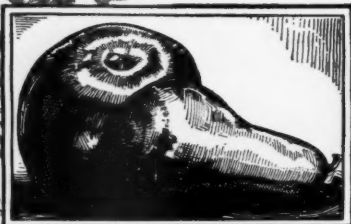
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the beets more frequently than he cultivated the rest of the orchard where no beets were grown. Observation showed that those trees, between which sugar beets had been planted, had grown on the average from 8 to 10 inches more per shoot than those in the other part of the orchard.

Another phase of winter injury which is still doing damage to peach trees is sun scald of the main scaffold branches. Some years ago the value of an open center peach tree was over-emphasized. As a result, there are many old and middle aged peach trees and a few young ones whose centers have been unduly removed. Almost without exception, severe opening up of the centers has resulted in sun scald. The direct rays of the sun play upon these exposed branches during February, and assisted by the freezes at night, cause death to the sunny side. Even during the summer months open centers are conducive to injury by permitting the unobstructed sun's rays to play against the branches. When winter injury and sun burn concentrate upon the same tissues, a cracking of the bark results and subsequent death.

### Control Measures

When a tree acquires a sickly appearance as a result of winter injury, little can be done for it. In severe cases, the tree should be removed. Where only a few branches die and the rest of the tree seems fairly vigorous, it might be made to produce for many years. Lack of vigor and pallor of leaves are often symptoms of former winter injury. Rejuvenation consists in light applications of nitrogen fertilizer and cultivation. Cover crops, where they exist, should be plowed up in order to stimulate growth, as considerable nutrients and moisture which are used by the cover crop will be made available to the trees. The first spring after a severe winter freeze, by which considerable damage is done, light pruning is recommended. During subsequent seasons if vigor is lacking, heavier pruning is suggested.

One of the best ways to control winter injury is to prevent it. Of course, it is impossible to influence the temperature, and so damage is expected when the temperature goes much below 15 degrees below zero. Growers can, however, prevent winter injury where the cause is due to wood immaturity. The type of inter-crop should be taken into consideration, and only early maturing ones used. Potatoes and sugar beets require late irrigation and are frequently the cause of injury to fruit trees. Any of the early maturing vegetables should prove satisfactory. The main consideration is to stop irrigating the orchard in time for the wood to become hardened and mature. On the light gravelly bench lands which dry readily after an application of water, irrigation may safely be prolonged after the last irrigation of the bottom lands. It is impossible to give a date upon which irrigation should cease because it will vary with the soil and the season.

The most practical measure for preventing injury to scaffold branches has to do with training the tree. Since open center trees invite injury, the modified leader type is recommended. This type of tree will not eliminate entirely such injury, yet it has been found to be an improvement on the old system.

### Gummosis

Gummosis is a symptom of a disease rather than a disease itself. However, the name has come to suggest any one of a number of disturbances, the causes of which are not always understood. An out-

break of a disease causing considerable gummosis to the lower part of the trunks of young cherries and peaches is under observation. The injured area extends from the ground to 18 to 24 inches up the trunk. It has the appearance of winter injured tissue; however, the gummy exudation from such areas flows much more copiously than from tissue which has been frozen.

Recommended control measures are only tentative, as the trouble awaits further study. All infected areas should be cut out and painted with a Bordeaux mixture paint. This is made by stirring raw linseed oil into Bordeaux powder. Enough of the oil should be used to facilitate use with a paint brush.

### Some Spraying Problems

By T. J. TALBERT  
University of Missouri

**O**NE OF THE most important essentials in spraying is thoroughness of application. The right materials must be applied at the right time and in the right way. If the spray does not entirely cover the parts of the plant needing protection, it is not likely to be effective.

No two orchards are alike in regard to the occurrence or the severity of attack of the common injurious diseases and insects. Where the grower, therefore, has sprayed his orchard properly for a number of years and knows the insects and diseases that are present, he may be able to change or vary the spraying suggestions, making the interval between applications longer or shorter as required. He may also change the kinds and proportions of spraying chemicals. If he knows his conditions and has studied his problems carefully, the alterations made may be beneficial and at the same time less expensive.

The directions and discussions given in the February issue of the AMERICAN FRUIT GROWER MAGAZINE are general and apply to the average fruit plantation. Moreover, it is assumed that all the pests requiring control by spraying are present and need sprays directed against them. The beginner must realize that some thought, effort, and time must be devoted to the problem of spraying fruits in order to understand suggestions and recommendations.

The grower must use his head. Fruit growers of experience who have studied their problems are getting beyond the fixed spray schedule. They have found that the spraying program may often give the best results if planned for particular varieties. They may also change their practices in many ways to fit special needs and conditions. This is precisely what should be done to secure the best results from spraying.

Other sprays may be used; this is especially true for dry lime-sulphur and other preparations. In some instances they may give better results than the standard materials suggested. It is important that the grower understand and take advantage of this fact where possible. Use the old and reliable material, however, until you or the Experiment Station have tested the new product for a series of years and found it to be better.

The tendency of the best growers is to use weaker sprays, make a greater number of applications, and do more thorough work. By such procedure better control of both diseases and insects is given, and there is less likelihood of doing injury by russetting and burning fruit and foliage.

### An Everbearing Seedless Apple?

By DELPHIA PHILLIPS

**A** GREAT DEAL of interest has been aroused among horticulturists and fruit growers by the seedless apple tree belonging to M. O. Walker at Burbank, Calif. Mention of it has been made several times in local publications, and Mr. Walker has taken samples of the fruit to a nursery which has been somewhat active in the introduction of new varieties of fruit, especially apples. Mr. Walker gave little attention to the chance apple sprout growing near his doorstep, except to allow it to grow there.

It grew fast, and in due time bore fruit. Mr. Walker did not think much about the first apple he found without seeds, but when he discovered all of them were seedless, he became interested. In

addition to this peculiarity, the tree has an exceptionally long bearing season, he states. The seedling is two years old and is a fine, straight young tree. It began blooming last April and continued to bloom until September, bearing three crops of apples.

Mr. Walker describes the apple as being of a greenish color with red tints. The apples, he says, are of good flavor and are good cookers. They are also of good size. It will be interesting to see what sort of fruit the grafts from this tree produce.

Incidentally, it may be remarked that Mr. Walker is nearly eighty years of age and lives in Burbank, named after the famous originator of so many new fruits and plants. (Picture on Page 30)



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## Motor Truck Offers New Opportunities

**M**ODERN TRANSPORTATION by motor truck is offering new opportunities for eastern farmers in competing with long rail hauls from distant commercial producing areas, according to Wells A. Sherman of the United States Bureau of Agricultural Economics in a Farmers' Week address at the University of Ohio.

"I believe that if all the facts could be known," Mr. Sherman said, "we would find that the entire territory east of Chicago is rapidly increasing its total production of fruits and vegetables, and that many eastern cities are already receiving a larger percentage of their total supply from relatively nearby sources than they were receiving five or six years ago."

"Highway improvement and motor truck transportation are making it possible for many eastern farmers to grow some products which were out of the question when these farmers were dependent upon wagon transportation. Prior to the development of refrigeration, practically all of our fresh fruit and vegetable production was in the immediate vicinity of the large cities. Then with the commercial manufacture of ice, the states bordering on Mexico and the Gulf of Mexico began to invade the eastern markets with enormous supplies of fresh products at seasons when eastern growers could not produce them. Now some distant districts are competing with these growers during their own marketing season."

The motor truck, Mr. Sherman pointed out, is not only enabling nearby producers to meet this competition from distant producing areas, but is effecting far reaching changes in the agencies of distribution. One of these changes is the advent of the itinerant trucker or huckster who operates in fruits and vegetables in units of a small motor truck load. In some sections these men furnish a principal outlet for an increasing number of farmers who produce some fruit or truck as a part of a mixed agriculture. In other parts of the country where few of these products are grown, they operate almost wholly as distributors from the railroad towns.

"Many jobbers in towns in the Missouri Valley," he declared, "are complaining that their out-of-town business is being disrupted by truck peddlers to whom brokers turn over cars of rejected or over-ripe products. The truckers peddle this stuff quickly through every small town within a radius of 50 or 100 miles, supplying every grocer who will buy at prices which the regular jobber who has bought a rolling car at the market price cannot meet. As the chain store in the larger cities is cutting into the jobber's business by putting the little independent grocer out of business, so the itinerant jobbing peddler is taking away the country customers of the wholesaler in the smaller cities."

"Thus we see the auto truck invading the field of local distribution in both directions. Some truckers are buying from the farmers and distributing to individual consumers or small storekeepers. Others are buying in the cities and distributing to farmers, villages, and the grocers in small towns. The speed of their vehicles enables them to cover considerable distances over modern highways, thus distributing perishable products with a rapidity and promptness heretofore unknown."

## Control of Apple Powdery Mildew

**A**REVISION of Farmers' Bulletin No. 1120-F, "Control of Apple Powdery Mildew," has just been published for free distribution by the United States Department of Agriculture. It gives a survey of the economic importance of apple powdery mildew, a description of the disease, and its cause, the control measures which should be followed, including pruning and spraying, and special suggestions of the technic and time of spray applications. It may be obtained by applying to the United States Department of Agriculture, Washington, D. C.

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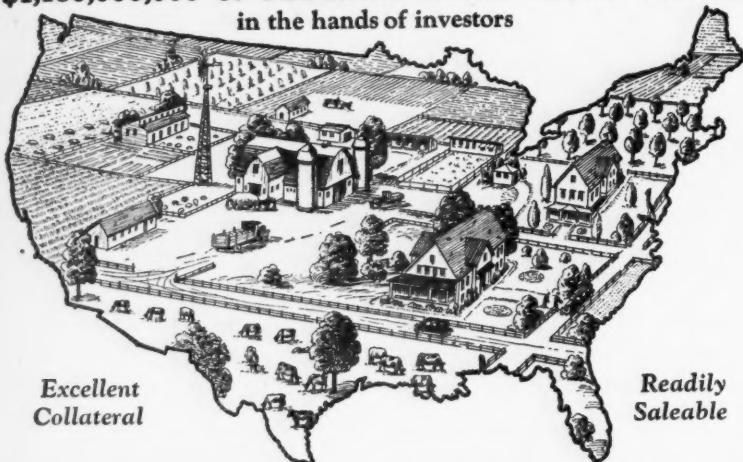
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# GASOLINE

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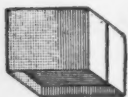
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## Pasturing Bees in Orchards Pays

(From Page Eight)

single flower is unlikely unless it is brought about by an insect visitation.

### Influence of Weather in Pollen Transfer

Finally, the weather is an important factor in the pollination of blossoms. Cold, rainy weather is believed to be unfavorable because bees remain in the hives. On the other hand, the weather may be too warm to bring about best results. In seasons when the temperature is high during the blossoming season, all the flowers seem to open at once. Pollination must take place within a few days, but under conditions where the blossoms open rapidly this is often impossible. I have seen cases where the blossoming season was so short that it was obviously impossible for all the insects present to visit more than a comparatively small percentage of the blossoms. The crop during such seasons was usually very light.

As new orchards were planted and more land cleared, the native wild bees were pushed back further and further into the remaining forests. Meanwhile, when the new trees came to bearing age, there was not enough pollen-carrying insects present to distribute the pollen effectively. The varieties were usually planted in large blocks of one kind which blossomed at the same time and thus added to the uncertainty of a sufficient number of blossoms being pollinated.

In connection with the general problem of pollination being carried on by the University of California, work has been conducted to determine the value of honey bees in carrying pollen. The first experiments were conducted with prunes used for drying, and later the work was extended to include varieties of plums used for fresh fruit shipments. The results were so decisive that a strong demand for bees at blossoming time was created. Instead of the bee men seeking orchards as pasturage for bees, the fruit growers are paying the commercial bee keepers for placing colonies in the orchards during the blossoming season. The usual practice is to place the bees in the orchard about a week before the blossoms open, and remove them after the blossoms close.

### Number of Colonies to Use

The number of colonies of bees to use in an orchard is one of the problems which until recently we have not had much information. Some of the older books suggested the use of one colony to the acre. Prof. Tufts recommended for deciduous fruits in California one hive for each acre, assuming that fairly strong colonies were used. A recent publication by the New Jersey Experiment Station indicates that one hive per acre is approximately the right number. In these experiments it was found that when all the trees in the orchard were in blossom the bees did not fly more than about 100 yards from the hive. On this basis, the author recommends that four or five colonies be placed together at one place and that these bee sections be placed at intervals of about 150 or 200 yards apart. He believes this to be a better plan than placing 12 or 15 colonies at greater intervals. A few years ago I observed a striking example of not distributing the bees uniformly over the area to be pollinated. In a 30-acre prune orchard about 15 or 20 colonies were placed on either side of the orchard. The trees near the hives were loaded to the breaking point, while about half way through the orchard there was a strip of trees that produced practically no fruit.

It is usually difficult to get accurate figures on crop production, but a few cases will show the beneficial results wherever bees have been kept in orchards. In an orchard of 180 acres of French prunes, the production was 344 tons of dried prunes without bees. The following season 115 colonies of bees were used and the yield was increased to 432 tons. In another case, with a seven-acre cherry orchard, the average yield was about 17 tons of fruit. By using 15 colonies of bees the yield jumped to 49 tons the first season, 51 tons the second and 47 tons the third.

### Wind Not Important Carrier of Pollen

Wind, although important as a carrier for certain kinds of pollen, such as corn pollen or walnut pollen, has been definitely

proved to be of little or no importance in distributing pollen of deciduous fruit trees. This fact has been demonstrated in several ways. Vaseline covered glass plates were placed under trees and hung on poles near by. Careful microscopic examination at frequent intervals showed that not enough pollen was carried in this way to make it safe to rely on the wind as a carrier. In another experiment several thousand blossoms were emasculated, leaving the pistil exposed. The petals were removed. Therefore insects were not attracted to these flowers and if any fruit resulted it could be attributed to wind pollination. Only one fruit set out of 7000 or 8000 flowers. Such a small percentage of set would indicate that it would be unsafe to rely on wind as a pollen carrier.

### Inter-Sterility of Certain Varieties

While the need for cross pollination with certain varieties of fruits was established experimentally many years ago, one of the most amazing facts concerning the setting of fruit was discovered a comparatively short time ago. The Oregon Experiment Station probably first called attention to this new peculiarity, which is called inter-sterility. This term simply means that in addition to being self-sterile, certain varieties of fruit will not set fruit when cross-pollinated with one another. Obviously, a grower who plants inter-sterile varieties is no better off than the one who plants large blocks of self-sterile sorts. Sweet cherries seem to be the worst offenders, but cases of inter-sterility have also been found in almonds and Japanese plums.

The combinations of cherries which should be avoided because of inter-sterility are: Bing, Lambert and Royal Ann (Napoleon); Advance and Rockport; Early Purple and Rockport. The inter-sterile almond combinations are Nonpareil and I. X. L.; and Langue doc and Texas. Among the Japanese plums, Formosa and Gaviota are inter-sterile. Another peculiar fact is that Tragedy, which is an early blue European plum, can be used to cross-pollinate a number of Japanese plums, but cannot be pollinated by them.

### Choice of Varieties

In making plans for new plantings or for topworking old orchards, the choice of varieties for pollinating is one of the most important points to be considered. Time of ripening and salability, of course, must also be considered. Inasmuch as many varieties need cross-pollination, it would seem desirable to secure those which work together effectively. It may even be advisable, at times, to use varieties of low market value, if they are efficient pollinators of other more valuable kinds. This combination may be secured by grafting one or two branches in the tops of the desirable varieties.

The following list gives the results of work done at the University of California. The varieties in the self-sterile list need cross-pollination to set fruit. The varieties in both the self-fertile and doubtful lists are greatly benefited by interplanting with other varieties. Full information concerning the best combinations for cross-pollination may be obtained from University of California bulletins.

### \*Almonds

All varieties tested proved self-sterile.

### Apples

Self-sterile varieties: Yellow Newtown, Esopus and Baldwin.

Self-fertile varieties: Yellow Bellflower, Gravenstein, White Winter Pearmain, Tompkins King, Rhode Island Greening, Delicious, Red Pearmain and Jonathan.

### Apricots

All varieties tested proved to be self-fertile.

### \*Cherries

All varieties proved to be self-sterile.

### Peaches

All varieties with possible exception of J. H. Hale proved to be self-fertile.

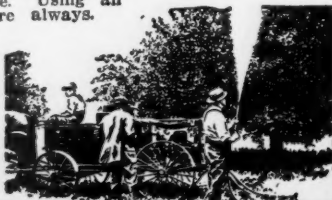
\*Certain varieties of almonds, of cherries, of Japanese plums are also inter-sterile.

†Data given are for interior valley conditions. Nearly all pears seem to be self-sterile under foothill conditions, while several are self-fertile under coastal conditions.

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Pears

Self-sterile varieties: Alencon, Bartlett, Bloodgood, B. S. Fox, Forelle, Le Conte, Madeline and Winter Nelis.

Self-fertile varieties: Comice, Flemish Beauty, Hardy and Howell.

Doubtful: Angouleme, Anjou, Bosc, Clapp Favorite, Clairgeau, Col. Wilder, Dana Hovey, Easter, Gifford, Glout Morceau, Kieffer, P. Barry and Seckel.

Plums

Self-sterile varieties: Abundance, Apex,

Burbank, Combination, Clyman, Duarte, El Dorado, Formosa, Gaviota, Imperial, Kelsey, President, Prize, Quackenboss, Robe de Sergeant, Satsuma, Silver Prune, Standard, Sultan, Splendor, Tragedy, Upright, Washington and Wickson.

Self-fertile varieties: Beauty, California Blue, Climax, Coates 14-18, Fellenburg, French (Agen), Giant, Methley, Santa Rosa and Sugar.

Doubtful: Burton, Diamond, Grand Duke, Pond, Stuart and Yellow Egg.

# J. E. Markham and His Orchard

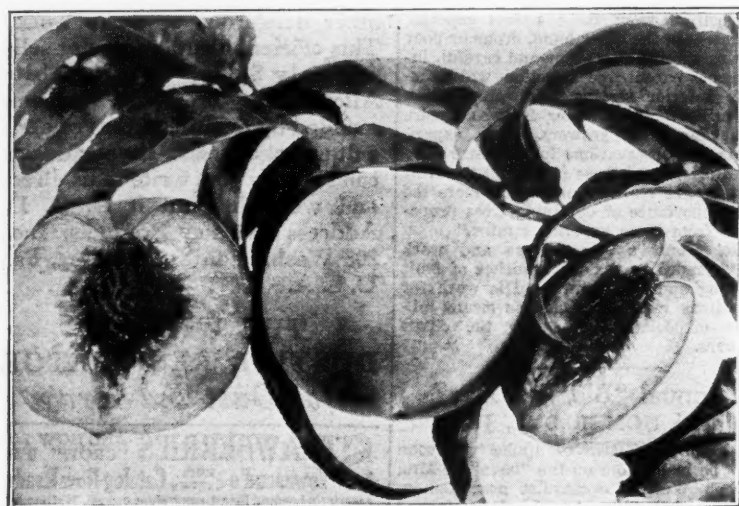
By IDA LEE JOHNSTON

NEAR the town of Xenia, Ill., is an eight-acre nursery owned by J. E. Markham. Until a short time ago, it seemed born to "blush unseen," and its wonderful fruit destined to be sold only in the home market.

But miracles cannot be performed without bringing notoriety. So it was that news of the fruit-wizardry of Mr. Markham leaked out of that inland seclusion and caught the attention of a large nursery and orchard company and they

It has been said that poets are born, not made; so it must be with the real horticulturist, for Mr. Markham successfully budded peaches at the age of eight, and later in life made thousands of experiments before he reached the conclusion that success lay in the selection of varieties and in pollination. In this he is not second to Luther Burbank.

He has peaches of various crosses bred for size, flavor and color; and, in some



This new peach, a cross between Hale and Old Gold, is declared by fruit experts to be exceptionally large, to have a small pit, and to be of good flavor

sent an expert to investigate. This expert found that only about half had been told.

His special attention was attracted to one particular peach tree, and after learning its history he did not hesitate to pay the splendid sum of \$2500 for it. Then, to prevent vandalism, he placed a guard over it for 60 days, during which time a steel cage was constructed around it as shown in the picture on page 30.

So far as is known, this is the first peach tree to be so highly honored. It is a cross between the J. H. Hale and the Old Gold peaches, and ripens some weeks later than the Hale. The fruit is round in shape, is bright red in color, and, as shown in the accompanying picture, has a very small seed. The nursery's verdict was, "The largest and finest flavored peach in America."

In the season of 1928 this tree was four years old and it bore six bushels of peaches, 35 per cent of which weighed one pound each, the smallest a half-pound, and there was not a single cull on the tree.

instances, he has as many as 12 varieties growing on the same tree. He also has crosses between the peach and the different varieties of plums, prunes, and so forth; for instance, between the peach and the German prune, which experts say is a peach of the highest flavor.

But while peach breeding is Mr. Markham's preference, his entire orchard is attracting the attention of leading orchardists in the entire country. The apple section is, in itself, a sight worth seeing. There is one apple tree bearing 12 distinct varieties, which, when in fruit, looks like an enormous bouquet, with its vari-colored leaves and apples.

The young stock in this wonderful orchard is all from tested trees of Mr. Markham's own breeding, and it seems remarkable that in the thousands of crosses he knows each one at a glance.

Mr. Markham is still a comparatively young man—only 47—and it is not impossible that he should create other wonders in the line of his decided and successful bent.

## New Varieties Tested

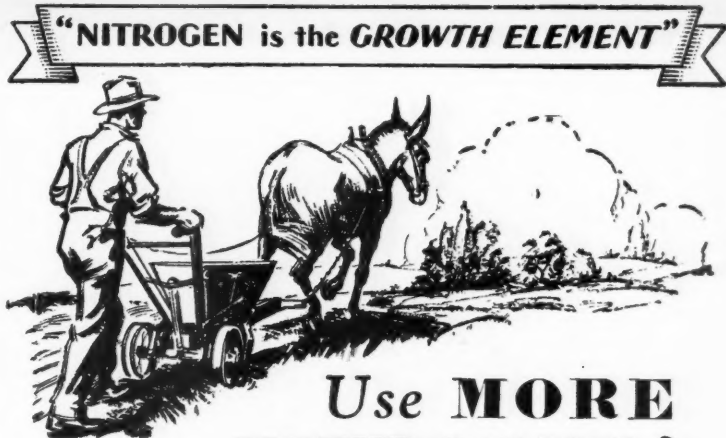
NEW VARIETIES of fruit originated by the fruit breeders at the New York Experiment Station at Geneva are propagated and distributed for testing by the New York Fruit Testing Co-operative Association. In his address at the annual meeting of the New York State Horticultural Society, Dr. U. P. Hedrick, director of the experiment station and head of the horticultural investigations there, brought out the fact that this association now has members in every part of the world.

The New York station has named 95 new fruits, including 32 apples, eight pears, four plums, two cherries, one nectarine, 19 grapes, 13 raspberries, one gooseberry, and 15 strawberries. Of this lot, 50 are now on the market. The fruit

testing association is credited with playing an important part in getting these new fruits before the public.

According to Dr. Hedrick, the association is a non-dividend-paying, co-operative organization, with headquarters at Geneva. It started in 1918 to distribute new and noteworthy fruits from the station plantations. At the end of the first year the association had a membership of but 54 and sold only \$215.73 of stock. At the end of the tenth year, September, 1928, there were 1177 members, with sales of \$10,928.80 and assets of \$13,500. Members have joined from every state in the Union, and there are many from foreign countries.

The association offers for sale this year 70 worthy new fruits.



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Chesapeake .....	.50	1.10	2.15	7.00	30.00
Champion (Ever) ..	.50	1.30	2.35	8.00	35.00
Dunlap .....	.30	.90	1.60	5.00	21.25
Gibson .....	.40	1.00	1.90	6.00	25.00
Gandy .....	.40	1.00	1.90	6.00	25.00
Haverland (Imp.) ..	.40	1.00	1.90	6.00	25.00
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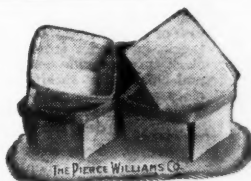
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Dept. 909, Galva, Ill.

## Value of "Bud Sports"

(By C. O. FINCHUM)

(From Page Ten)

Red Stayman promises to be much superior to the regular strain. The original tree is growing on the farm of B. C. Moomaw in Virginia. The tree is typical of Stayman in every way. The only difference is that the fruit has much more color and develops it much earlier in the year. The picking dates of the two strains are practically the same, however. Red Stayman does not scald, which is one of the Stayman's serious faults.

A few years ago E. N. Sawyer, of New Hampshire, found a Black Baldwin strain. One limb growing on an ordinary Baldwin tree produces apples which develop twice the color that is normal for the Baldwin. Undoubtedly, the black strain will appeal to the public much more than the regular Baldwin.

The solid Red Willow Twig is simply a true bud sport of Willow Twig. The original limb was found in the orchards of C. F. Breden, Calhoun County, Illinois. The sport limb occupies one-half of the tree. The fruit starts to color about three weeks before the normal time for Willow Twig. Then at the regular picking time it has twice as much color.

The Red Spy is a bud sport from a Spy tree which has borne bright red apples on one branch for 40 or 50 years. It was not propagated until the New York Fruit Testing Association took scions from it several years ago. The trees on their premises produce Red Spys very marked in the red characteristic. A number of other young trees now in fruit in New York state bear out that fact.

The Red Duchess is also a typical color bud sport. The fruit has a solid bright red color, being much more attractive than that of the true Duchess. The propagated young trees bear fruit which has the bright red characteristic.

The original crimson Gravenstein limb was found by A. S. Banks, Waterville, Nova Scotia. The new strain has been propagated and given a good trial. All of the grafts and young trees have borne fruit of high color. Later selections have brought out a triple-red Gravenstein that is much redder than the original Banks strain.

W. H. Goodenough, Jr., of Hood River, Ore., has found a Spitzenburg limb which produces solid red apples. He has observed this repeatedly year after year. The other limbs near by bear fruit which has only about one-half as much color.

The Red Rambo is a decided improvement on the regular Rambo. L. B. Yaple, Chillicothe, Ohio, has one tree which produces fruit of a solid red color. Like the Red Stayman, this is a tree bud sport.

Prof. F. H. Ballou, Newark, Ohio, has a Grimes Golden limb which is a true bud sport. For a number of years this limb has been producing apples very large in size. In fact, the new form averages about 10 ounces to each specimen, while the fruit from the remainder of the tree averages about five ounces for the better specimens. The apples are just a little more oblate than the ordinary type. Prof. W. S. Brown of Oregon Agricultural College also discovered a limb of extremely large Grimes.

## A Popular Cherry Mutation

The King Albert cherry is one of the most popular cherry mutations. It is nothing but a variation of Lambert. A few years ago Edward Remy of Yakima, Wash., observed one limb on a Lambert tree which was quite different from the true Lambert. The King Albert is golden yellow in color and is distinguished by a deep crimson stripe that extends from the cavity of the fruit to the tip. When the fruit is mature, the same dark cavity runs from the skin to the pit. Grafts of this bud sport bear fruit exactly characteristic of that borne on the original limb.

These fruit mutations certainly do mean a great deal to the fruit grower. Instead of growing the ordinary strains which are lacking in color, the double red strains may be grown. From the color standpoint, practically all of the fruit will pass into the fancy and extra fancy grades. It will command a much higher price on the apple markets.

## Select Varieties Carefully

Prof. W. J. Green, for years chief in

horticulture at the Ohio Experiment Station, once said that if he were planting an orchard for himself he would greatly prefer that the trees he used be propagated from parent trees of known superior bearing record. As the years pass by, more and more orchardists and horticulturists have come to Prof. Green's attitude. For numerous reasons, nursery stock propagated from trees of known superior bearing record should certainly receive a preference. Therefore, in the setting and development of new orchards, orchardists should study varieties and variety strains very carefully. The aim, of course, is to plant those varieties and strains that will make the most money.

Dr. A. D. Shamel of the United States Department of Agriculture, a man who has studied and knows this bud variation problem from a practical and scientific standpoint probably better than any one in the entire world, states:

"These improvements in color, size, shape of fruit and increased production, as well as other important characteristics, can unquestionably be reproduced by propagation from these known superior strains. On the other hand, drone or poor bearing strains also occur and careful, intelligent, parent-tree selection will eliminate inferior strains from propagation and will result in better fruit and more profit for fruit growers. Our experiments and observations for 20 years have definitely proved these facts, and the fruit growers are realizing more and more the vast importance of obtaining trees propagated from these superior strains."

Dr. Shamel's observations and work are extended to various branches of fruit growing and horticulture. His work for the citrus industry alone has meant millions of dollars' saving to the citrus growers.

## Annual "Blossom Day"

By HOMER DYE, JR.

EIGHTY ACRES of apples will soon be in blossom on the "lawn" of Mrs. Joseph Weston, orchardist near Belton, Mo., as pictured on page 30. It is planned to again make this orchard the Mecca of apple growers on annual "blossom day," to be conducted by horticulturists from the Missouri Agricultural College in collaboration with county farm bureaus of surrounding counties.

Prof. E. A. Bierbaum, who is in charge of the horticultural extension department at the college, will be a speaker at this event, and Prof. T. J. Talbert of the horticultural department will lecture on some of the scientific aspects of fruit growing. Prof. F. W. Faurot, who is in charge of the horticultural station at Mountain Grove, will also be on the program, according to tentative plans. Demonstrations in pruning and the general care of the trees, together with suggestions on the packing and marketing of fruit, are scheduled.

The fame of the annual blossom day at the Weston farm is widespread enough to insure visitors from many sections of the state as well as from the immediate neighborhood.

Tractor Supplies Oil  
Service in Wet Orchards

CALIFORNIA orchardists recently inaugurated a time-saving practice worth passing along, according to Jay C. Doyle, of that state.

During the late cold spell, the orchard tractor was used most effectively in the groves of the Chapman Orchards Company, near Strathmore, Calif., in hauling oil into the groves for use in the heaters. Two sleds were hooked behind a thirty horsepower crawler-type tractor, with a chain spaced between the sleds when not too rutty. Thus arranged, oil could be drawn from each side to feed the heaters.

Despite the mud and water encountered in the groves, the tractor moved with ease in hauling the sleds. The work of feeding the 6000 heaters was completed at noon each day, whereas many growers were not finished with this important task until night. (Picture on page 30.)



## The safe way

THE chemicals that you use in spraying fruit trees are always irritating to your throat. They may injure your lungs and impair your health—unless you protect yourself. Always wear a Willson Dustite Respirator for Dust and Spray when you're spraying, treating seed, threshing, or doing any other dangerous or dusty work! This efficient health protector sells for only \$2.25. Comfortable. Allows free breathing. Recommended by manufacturers of agricultural chemicals. If your dealer can't supply you, write to us direct and we will send it C. O. D. Address Willson Products, Inc., 203 Washington St., Reading, Pa., U. S. A.

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The ROSE TREE OF CHINA (Prunus Trichos) is the most beautiful and showy of all small trees. It begins to bloom before the leaves appear in the spring, being literally covered with very double rose-like pink flowers. As an ornament from early spring until late fall it has few equals. This symmetrically formed, graceful little tree grows usually to a height of but 8 feet, and is attractive as a specimen or when planted in groups or shrub border. It is hardy and easily grown, and no lawn is so small that room can not be found for at least one of these wonderful trees. Many who have seen it declare it to be the most beautiful tree they have ever seen. The rose-like blossoms make fine cut flowers.

Choice trees for \$1.00 each; 3 for \$2.50, by parcel post, prepaid.

For 50c extra we will include three small TULIP TREES—fine ornamental shade trees with tulip-like flowers.

Our stock of trees will not last long at these low prices. Order now, and state when you want trees shipped.

CATALOG FREE. BURGESS SEED & PLANT CO. 239 T. R., GALESBURG, MICH.

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### No 145 ANGLE SPRAY ROD

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With the No. 145 Angle Rod you can reach the under side of trees, use a fog spray at short distances and even break up the spray at the long position.

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5½ feet long with a 40° angle at the nozzle end. Made of brass throughout. Weighs only 4½ pounds. Operator has positive control of spray mist. Saves as much as 25% in spray material—decreases labor—increases speed.

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Send now for complete literature, and names of users—or better still, enclose check or money order for \$1.00 (C. O. D. if preferred) and try this great spray rod on your own trees. If you do not think it is worth every cent of the price and more, return it and we will refund your money. Satisfaction guaranteed.

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"I want to recommend your 'Cutaway' Disk Plow to anyone who is in the orchard business, and will say there is no other implement that will reach up under the branches of low-spreading trees and do as good work pulverizing the soil and killing weeds as this implement. I used it instead of a moldboard plow to plow the orchard ground which I planted to tomatoes, leaving the ground level and in fine condition, turning the ground over to a depth of 7-8 in. This plow can be used to cultivate up close to the trees and still leave a space between the trees for sod or any other crop of that nature, which no other implement would do without tearing up the middle." **Cleo Plummer, Mooresville, Ind.**



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Single Action Harrow fitted with cutout or solid disks of cutlery steel, heat treated and forged sharp for better work and longer wear. Reversible gangs. Light draft. Disks carry weight of machine. Made with extension heads for orchard work. Mail coupon for free catalog and book. "The Soil and Its Tillage."

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### Value of "Bud Sports" (By R. EDWARD TRUMBLE) (From Page Ten)

like the billions of other buds grown by the parent variety.

It is a well established fact of science that the hereditary characteristics are transmuted through the chromosomes of the cell. The chromosomes are small bodies in the cell which vary in number in different plants and animals, but the number is always uniform in the cell of the same species. Under normal conditions, the chromosomes divide with great exactness, and the hereditary characteristics do not change, or very slightly, especially under asexual conditions. Where the sexual condition prevails, as in plant breeding and cross-pollination, the chromosomes of two cells are brought together and new hereditary characteristics are formed. But not so with our asexual bud sport. The change in the chromosomes must come from physiological or chemical disturbances or changes. This writer holds the opinion that even natural conditions, as cited above, that give rise to decided bud disturbances at critical times, affect the chromosomes of the cell and cause mutations, resulting in sport buds and new varieties.

As to chemical changes that might affect the chromosomes, it is of decided importance to note that the Starking and Richared, and other red sports from the Delicious, contain a high percentage of anthocyanin. Anthocyanin is a coloring matter found in the cell sap of many plants. It is red in the presence of acid, otherwise blue or violet. As this substance is so prominent in the various red sports of the Delicious, the question arises as to whether this substance may have had something to do with the changes in the chromosomes of the parent cell in this series of mutations that has given us new and decidedly different Delicious varieties.

#### The Future Behavior of Sports

Numerous questions are often asked me, such as: Will these sports be permanent, or will they change? Are they unstable? Will they revert?

In the opinion of the writer, decided sport mutations, such as we have considered, will be permanent, as permanent as any variety. There will doubtless be individual cases of sporting on these sport varieties. But how can it be even conceived, in the light of plant physiology and kindred information, that whole orchards of trees will change from what they are to something else? A notable example is the Black Ben Davis, a sport, and now after almost three decades, it is exactly as it was when the mutation first occurred. We need have no worry on this point, the sport varieties will remain as they are, unless, in individual cases, they sport again, and then who can tell but that we may find some new fruits vastly superior to anything we now have, for the spirit of all life is progress.

### World's Largest Apple Pie By FRANK S. REYNOLDS

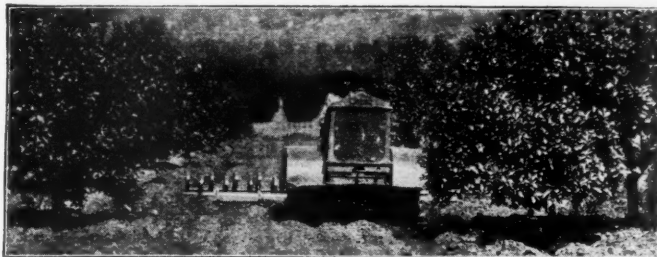
**THE APPLE GROWERS** of Yakima, Wash., are credited with having made the largest pie that has ever been made. The pie, pictured on page 30, was 10 feet across and eight inches deep, and was filled with over a ton of apples. One barrel of flour, a hundred-pound bag of sugar, nearly three pounds of cinnamon and 50 pounds of shortening were used to make the pie, which was baked in a Dutch oven especially built for the occasion. After it was baked by a committee of the city's bakers it was served to 2000 school children who had gathered for the wonderful event.

#### The Tactful Guest

He—I made an awful mistake just now. I told a man I thought the host must be a stingy old piker, and it happened to be the host that I spoke to.  
She—Oh, you mean my husband!

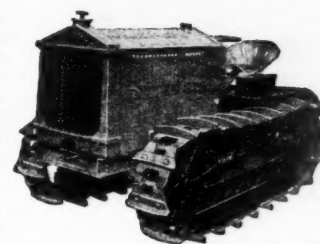
"What's the trouble, son?" solicitously asked the electric lineman of his three-year-old boy.

"Daddy," answered the child, "I picked up a little bug, and one end wasn't insulated."



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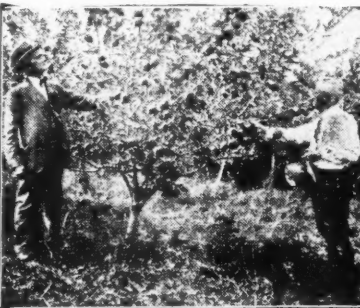
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A five-year old, 3rd generation, Richared Delicious tree with its heavy load of large, BLOOD-RED, all "Extra Fancy" apples, being inspected by O. M. Morris, Professor of Horticulture of Washington State Agricultural College, and A. T. Gossman, Manager of "C & O" Nursery Company, Wenatchee, Washington.

This amazing apple is sure to make large profits for those who grow them. It is **JUST LIKE THE POPULAR DELICIOUS** in shape, size, texture, flavor and ripening period, but in addition it colors **SOLID BLOOD RED** weeks earlier without stripes. Nearly all apples color "Extra Fancy" grade. Scientifically it is a bud sport or mutation.

Genuine **Richared** Delicious trees can be obtained **ONLY** from the following reliable nurseries. They ship everywhere and guarantee arrival of stock in good condition. **BEWARE OF IMITATIONS AND IMPOSTORS.**

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**Bountiful Ridge Nurseries,** Princess Anne, Md.  
**Chase Brothers Company,** Rochester, N. Y.  
**"C & O" Nursery Company,** Wenatchee, Wash.  
**Earl E. May Seed & Nursery Co.,** Shenandoah, Iowa.  
**Utah Nursery Company,** Salt Lake City, Utah.

**Milton Nursery Co.,** Milton, Ore.  
**May Nursery Company,** Yakima, Wash.  
**Neosho Nurseries Co.,** Neosho, Mo.  
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**Columbia & Kaplan NURSERY COMPANY**  
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("The Wenatchee Nurseries")

# Buyers' Service Bureau

For the convenience of our readers we list below some lines of fruit farm equipment and home conveniences. If you are considering the purchase of any of these items we will be glad to forward your request for information to responsible manufacturers. From them you will receive full information as to prices, etc.

## SPRAY MATERIALS

- ☐ Miscible Oil
- ☐ Fish-Oil Soap
- ☐ Dry Lime-Sulphur
- ☐ Liquid Lime-Sulphur
- ☐ Bordeaux Mixture
- ☐ Copper Sulphate
- ☐ Hydrated Lime
- ☐ White Arsenic
- ☐ Arsenate of Lead
- ☐ Colloidal Sulphur Sprays
- ☐ Sulphur-Lead Sprays
- ☐ Summer Oil
- ☐ Contact Sprays for Sucking Insects
- ☐ Combination Insecticide and Fungicide
- ☐ Calcium Caseinate

## SPRAYING EQUIPMENT

- ☐ Power Spray Rig
- ☐ Horse Traction Rig
- ☐ Cart Rig, Hand Pump
- ☐ Barrel Outfit
- ☐ Compressed Air Sprayer
- ☐ Hand Spray Pump
- ☐ Power Spray Pump
- ☐ Spray Rig Tank
- ☐ Water Supply Tank
- ☐ Supply Tank Tower
- ☐ Pipe and Fittings
- ☐ Pressure Spray Hose
- ☐ Spray Nozzles
- ☐ Spray Rods
- ☐ Spray Guns
- ☐ Spray and Dust Masks

## FOR THE HARVEST

- ☐ Ladders
- ☐ Fruit Pickers
- ☐ Picking Sacks
- ☐ Orchard Pick-up Wagons
- ☐ Berry Crates and Fillers
- ☐ Box and Shook Stock
- ☐ Bushel Baskets
- ☐ Two-shape Baskets
- ☐ Less-than-bu. Baskets
- ☐ Fiber Fruit Packages
- ☐ Package Labels
- ☐ Canning Equipment
- ☐ Fruit Dryers or Dehydrators
- ☐ Fruit Pitters
- ☐ Corers
- ☐ Slicers
- ☐ Grading Machinery
- ☐ Fruit Cleaners
- ☐ Cider Presses
- ☐ Pasteurizing Outfits
- ☐ Barrel Facers
- ☐ Basket Facers
- ☐ Barrel Presses
- ☐ Box Presses
- ☐ Liners and Cushions
- ☐ Stencils
- ☐ Wax Paper

## DUSTING EQUIPMENT

- ☐ Power Dusters
- ☐ Power Mixer and Duster
- ☐ Traction Cart Duster
- ☐ Hand Power Duster
- ☐ Knapsack Duster

## DUST MATERIALS

- ☐ Dormant Dust
- ☐ Superfine Dusting Sulphur
- ☐ Sulphur-Lead Dust
- ☐ Monohydrated Copper Dust
- ☐ Copper-Lead Dust
- ☐ Nicotine Dust

## SEEDS

- ☐ Garden
- ☐ Field
- ☐ Flower
- ☐ Bulbs
- ☐ For Cover Crops
- ☐ Seed Potatoes

## ELECTRICAL

- ☐ Wiring and Lighting Supplies
- ☐ Electrical Refrigeration
- ☐ Vacuum Cleaner
- ☐ Kitchen Motor
- ☐ Sewing Machine Motor
- ☐ Separator Motor
- ☐ Electric Fans
- ☐ Floor Lamps
- ☐ Electric Milkier
- ☐ Electric Water Pumps
- ☐ Electric Iron
- ☐ Grills
- ☐ Heaters
- ☐ Vibrators

## PAINTS, OILS, ETC.

- ☐ Inside Paint
- ☐ Barn Paint
- ☐ Furniture Stains and Enamels
- ☐ Auto Enamels
- ☐ Enamel Polish
- ☐ House Paint
- ☐ Wall Paper
- ☐ Cold Water Wall Finishes
- ☐ Roofing Paint
- ☐ Roofing Cement
- ☐ Lubricating Oil
- ☐ Cup Grease
- ☐ Belt Dressing
- ☐ Transmission Grease

## TILLAGE TOOLS

- ☐ Single Walking, 2-horse
- ☐ Single Walking, 1-horse
- ☐ Single Riding
- ☐ Riding Gang
- ☐ Disk Plows
- ☐ Horse Harrow
- ☐ Tractor Tillage Tools
- ☐ Horse Cultivators
- ☐ Hand Cultivators
- ☐ Grape Hoe
- ☐ Spiketooth Drag
- ☐ Springtooth Drag
- ☐ Subsoiler, Horse
- ☐ Subsoiler, Tractor
- ☐ Rakes
- ☐ Hoes
- ☐ Scuffle Hoe

## TRACTORS

- ☐ Vineyard or Garden
- ☐ Orchard

## TRUCKS

- ☐ Light Delivery
- ☐ Medium
- ☐ Fast
- ☐ Heavy Hauling
- ☐ Chassis

## STOVES AND RANGES

- ☐ Gas Range
- ☐ Gasoline Range
- ☐ Electric Range
- ☐ Coal Range
- ☐ Electric Hot Plate
- ☐ Electric Grill
- ☐ Blue Flame Kerosene Range
- ☐ Base Burner
- ☐ Coal Heater
- ☐ Wood Burning Heater

## MISCELLANEOUS CONTROL EQUIPMENT

- ☐ Codling Moth Bands
- ☐ Fumigants for Root Insects
- ☐ Sticky Preparations

## CLOTHING

- ☐ Ladies' and Children's Clothing
- ☐ Aprons
- ☐ Men's Clothing
- ☐ Overalls
- ☐ Rayons and Silks
- ☐ Woolens
- ☐ Cotton Fabrics
- ☐ Linens

## NURSERY STOCK

- ☐ Plants
- ☐ Trees
- ☐ Small Fruit Plants
- ☐ Strawberry Plants
- ☐ Ornamentals
- ☐ Perennials

## FOR THE HOUSE

- ☐ Plumbing Supplies
- ☐ Bathroom Fixtures
- ☐ Warm Air Furnace
- ☐ Hot Water Heating System
- ☐ Steam Heating System
- ☐ Oil Burners
- ☐ Carbide Gas System
- ☐ Farm Electric Plant
- ☐ Gasoline Lamps
- ☐ Pressure Water System
- ☐ Gravity Water System

## AUTO ACCESSORIES

- ☐ Tires
- ☐ Batteries
- ☐ Spark Plugs
- ☐ Gas Savers
- ☐ Delivery Bodies
- ☐ Auto Washers

## FARM TOOLS, ETC.

- ☐ Gasoline Engines
- ☐ Kerosene Engines
- ☐ Carpenter Tools
- ☐ Machinists' Tools
- ☐ Pipe Fitting Tools
- ☐ Masons' Tools
- ☐ Plasterers' Tools
- ☐ Lathes
- ☐ Buzz Saw Outfit
- ☐ Stump Pulvers
- ☐ Fencing Tools
- ☐ Post Hole Diggers
- ☐ Shovels
- ☐ Picks
- ☐ Axes
- ☐ Electrical Wiring Tools

## HOUSEHOLD CONVENIENCES

- ☐ Power Washing Machine
- ☐ Power Mangle
- ☐ Clothes Dryer
- ☐ Dish Washer
- ☐ Sewing Machine
- ☐ Phonograph
- ☐ Radio
- ☐ Ladders
- ☐ Sweepers and Cleaners
- ☐ Gasoline Irons

## FERTILIZERS

- ☐ Nitrogen Fertilizers
- ☐ Phosphates
- ☐ Potash Salts
- ☐ Mixed Mineral Fertilizers
- ☐ Animal Manures
- ☐ Agricultural Lime
- ☐ Gypsum (Landplaster)

## MISCELLANEOUS ORCHARD EQUIPMENT

- ☐ Orchard Heaters
- ☐ Orchard Thermostats
- ☐ Thermometers
- ☐ Microscopes
- ☐ Pruning Tools
- ☐ Grafting Tools
- ☐ Grafting Wax

## FURNITURE, ETC.

- ☐ Living Room Furniture
- ☐ Bed Davenport
- ☐ Tables
- ☐ Desks
- ☐ Rugs
- ☐ Bookcase
- ☐ Dining Room Sets
- ☐ Silverware
- ☐ Dishes
- ☐ Glassware
- ☐ Table Linens
- ☐ Kitchen Cabinet
- ☐ Kitchen Furniture
- ☐ Cooking Utensils
- ☐ Aluminum Ware
- ☐ Enamelled Ware

Check the items upon which you wish information that will aid you in making an intelligent purchase. Send it TODAY to

Buyers' Service Bureau, American Fruit Grower Magazine,  
53 W. Jackson Boulevard, Chicago, Ill.

Gentlemen: I am planning to buy the articles checked above.

Name .....  
Address .....

# How About Our Spray Materials?

(From Page Five)

of this picture of horticultural progress. When the station workers required more power, pressure, volume, speed, in spray equipment, did they prepare blue-prints and specifications of engines, pumps, guns and nozzles? No, that required mechanical knowledge and experience. The stations told the manufacturer what the machine should do and received equipment that did as required.

## Time-Worn Materials?

In the equally important field of spray and dust materials there is little evidence of such co-operative effort between station and chemical laboratory, and that little has borne little fruit.

A tinted lime wash, designed to frighten away pilferers from French vineyards of 40 years ago, is generally officially accepted as the standard copper fungicide, though some brave souls do vary the proportions of lime and copper sulphate from that of the French peasant's accidental mixture. This last may be a bit unfair. We formerly regulated the proportions of lime and copper in Bordeaux by immersing a knife blade in each batch and observing what happened to the knife. But when indignant womankind demanded a stricter accounting for kitchen knives (no grower would think of using his own pocket knife for the purpose), an official formula had to be supplied.

Liquid lime-sulphur, with reasonably careful handling and under the right conditions of temperature and humidity, is admittedly a good insecticide and fungicide, but severe fungous infections have penetrated it in sections and in seasons favorable to certain types of fungi. As a foliage spray it is too often dangerous: it can and does blemish the fruit. Has experimental horticulture taken this problem to manufacturing chemistry with the request: "Take this good material and make it better. Lessen its danger, increase its effectiveness, make it convenient, and for heaven's sake relieve its halitosis, if you can." Why not?

Is the "government formula" for making oil emulsion a fairly safe proposition to put up to the average fruit grower? Have not some station officials suggested that the oil industry might put up uniform emulsions? And what was the invariable reply? That no practical means could be found to stabilize a heavy oil emulsion and that no oil refinery cared to risk marketing the product. The oil industry is keenly interested in developing the market for petroleum products. Should fruit growers be generally advised to use a petroleum product that no oil refiner will take the risk to make and market?

Fairness to lubricating oil emulsions demands the statement that they have been generally valuable in many sections. They provided a weapon against types of destructive insects for a time when no safer weapon was available. Carefully compounded from uniform materials by a workman with a knack for the task, and freshly applied, they generally give good service. But fruit growers who use lubricating oil emulsion are gambling with the law of averages. Such emulsions have been known to "break" unexpectedly and unless closely watched at all times are a potential source of danger. Should not the grower be informed if there are safer, more stable, and generally more effective petroleum controls?

Is arsenate of lead the final stomach poison, and if so, is there no other way to protect from chewing insects? Is there not a growing belief that insects are developing a "tolerance" for arsenic?

These are only a few of the questions growers are seriously asking. Even while asking, we acknowledge that in favored sections with skilled handling the old standard materials give fair commercial control in most seasons. But each has serious faults under the best of conditions.

The designing rooms of the spray machine factories co-operated successfully with our experiment stations in the development of new types of control equipment and improved this equipment year after year. This co-operation has benefited the grower, the station and the manufacturer.

The laboratories of modern chemical in-

dustry were never generally utilized in the same manner by either the agricultural colleges or the experiment stations insofar as the development of horticultural chemicals is concerned.

## Laboratory Products Improved

When industrial laboratories have attempted to use "standard" formulas as recommended by the stations and to give the grower a uniform, ready-to-use product, they have sometimes come to grief. Witness the ineffectiveness of paste Bordeaux and the disasters with commercial emulsions, to cite but two examples.

Liquid lime-sulphur concentrate and arsenate of lead are two examples of the successful commercial production of fruit pest control materials. Both were distinct improvements over former products. Each of these two products was offered about simultaneously to the growers and to the experiment stations. In both cases substantial numbers of growers accepted these materials before official approval was forthcoming. So far as can be learned neither material was produced at the suggestion or with the co-operation of experimental workers. Both encountered stiff resistance from stations in many sections.

## Industry Employs Science

But industry, whether mechanical or chemical, will not be denied. Though our experiment stations have very generally failed to call the chemical industry into their counsels, we find that chemical industry appears to be successfully employing entomologists and pathologists to develop and conduct its own research in collaboration with expert chemists. Out of this strictly commercial union of science and industry, improved types of materials are slowly being developed.

Commercial ready-mixed Bordeaux was as effective as bath salts as a fungicide until chemical industry took it apart and rebuilt it anew as a laboratory fungicide. Now it is effective and will be improved.

Lime-sulphur itself has been taken into the commercial chemical laboratory, its power to injure abated and its bulky water content evaporated, for convenience and economy in transportation and handling. It, too, should improve from year to year.

The laboratories of Industry hopefully investigated the "government formula" for oil emulsion and generally turned it down cold; protesting that it could not be stabilized by any means within the limits of practical cost. Instead, Industry created miscible oils of uniformity, effectiveness and stability. These also are being improved as to safety and effectiveness as the demand for improved spray materials warrants.

The structure of lead arsenate has been broken down to microscopic fineness, with intent to increase its adhesiveness and killing power.

Industry examined the tobacco dusts and washes, broke open the raw material, extracted and combined its alkaloid into nicotine sulphate, improving and stabilizing its effectiveness. Fortunately for the growers, this material was speedily accepted.

Sulphur has been broken down nearer to atomic fineness and its effectiveness increased by processes only possible in commercial production.

## Genuine Progress Deserves Encouragement

These are but examples of the few genuine forward steps that have been seriously made toward better chemical weapons against fruit pests and it is this type of progress that should be encouraged and not resisted.

Some experiment station workers have attempted to read into the February editorial in this magazine a plea that experiment stations take up the promotion of "cure-all" materials. It is true some serious attention might profitably be given to this class of nuisances. The inarticulate demand on the part of growers for more effective and less dangerous control materials has developed a perennial crop of horticultural panaceas, very generally ineffective or dangerous or both. Defoliated trees, injured crops and ruined orchards here and there in every state attest the fact that a spray material is not necessarily an improvement simply because it is new.

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## Index to Advertisements

The concerns whose advertisements appear listed below are equipped to give prompt and satisfactory service to the American fruit grower. Most of them issue literature that is freely at the disposal of our subscribers. It is to the advantage of all that when writing to an advertiser you use the address exactly as it appears in the advertisement, and that you state in your letter: "I Read Your Advertisement in AMERICAN FRUIT GROWER MAGAZINE."

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But how is the grower to separate the good from the bad, the genuine from the spurious? If the grower is a business man, as many are, he applies the same discrimination as do business men in other lines when a choice is offered of goods claiming equal merit. He investigates the responsibility of the manufacturing company, its age and its standing in the industry, and will, if wise, use a new material experimentally at first and in comparison with his old.

### Attitudes of Some Stations

But why should any grower be compelled to experiment? What have our experiment stations been doing in the meantime? Have they tested the materials seriously offered by responsible concerns? Some of them, yes, very efficiently. The confidence of the growers in such stations is as granite.

Have they investigated and have they given credence to the work of other stations in other states? Not as a rule. Experiment stations are staffed by human beings and are sometimes subject to human rivalries. It is but human to seek to demonstrate another station is dead wrong.

Given the means and the disposition to do a thing, it generally gets done. A station that fairly meets a problem and welcomes co-operation with industry improves the lot of the growers, welding itself to their confidence.

Many stations will make no trial of a material at all until a substantial number of growers in their territory use it with apparent success. Strict justice compels the admission that many cannot afford the cost. They have not the available funds. Testing spray chemicals constitutes but one, though a vitally important, part of the many important projects an agricultural experiment station must seek to undertake.

Some protest it is the business of the manufacturer to test his own products. The manufacturer in turn counters with the reports of other experiment stations, with records of orchard trials, and sometimes even with reports of the Crop Protection Institute.

Numbers of instances have been known where experiment station authorities have not accepted as final even the evidence produced through Crop Protection Institute experimentation, and have reserved any positive or final judgment until they themselves could find opportunity to duplicate the same tests. And these tests, properly made, require a period of years.

There appears to exist generally a feeling on the part of station authorities that each station must individually test each product, claiming to be an improvement over the old standards, before recommending the product to its followers. Yet with entire accord, they unanimously recommend the old standards—Bordeaux, lime-sulphur, arsenic, to name but a few, for specific uses to their growers.

All we can ask of any new product is that it shall prove a genuine improvement over an old standard in some appreciable respect. Is it fantastic or "commercial" to timidly suggest that the merits of claimed improvements on these old standards could be easily determined; that unbiased tests by a half dozen stations in properly separated locations can determine whether or not a new product is an improvement over an old standard?

### We Should Know the Facts

The foregoing represents a picture of conditions as viewed by the writer and commented upon in the February editorial. There appears to be a distinct need for assembling the available information on all spray materials, new and old.

If a new product is an improvement, we should know it, for it is only by determining the improvement and accepting it that progress is speeded. If a claim of superiority is just trade talk, we should know that.

The grower who uses spray materials as a means of securing a more salable product wants only the facts, but he wants to be reasonably certain they are facts and not opinions.

Means could be established for an unbiased, nation-wide appraisal of spray materials. Facts could be gathered. Upon these facts every spray material could be measured by its similarity to or its improvement upon the existing standards.

## The FRUIT FARM MARKET

ADVERTISING RATES, 15 CENTS A WORD

Write advertisement on separate sheet. Please enclose cash with order. For advertisements addressed in care of this publication, allow 5 words for address.

### SPECIAL NOTICE

All advertising copy, discontinuance orders or change of copy must reach this office by the 10th of this month for next issue.

AMERICAN FRUIT GROWER MAGAZINE  
53 West Jackson Boulevard, Chicago

### AGENTS—SALESMEN WANTED

BIG PAY EVERY DAY TAKING ORDERS FOR dress and work shirts, pants, overalls, sweaters, underwear, hosiery, pajamas, play suits. Experience unnecessary. Outfit free. Nixford Co., Dept. 192, 4922 28 Lincoln Ave., Chicago.

BIG OHIO CORPORATION HAS COUNTY POSITION open. \$50 weekly commission. Earnings start immediately. Good for \$5000 yearly. We furnish everything, deliver and collect. Capital or experience unnecessary. Fyr-Fyter Company, 1835 Fyr-Fyter Bldg., Dayton, Ohio.

WE PAY \$45 A WEEK AND EXPENSES AND give Ford auto to men to introduce poultry and stock compounds. Imperial Co., D-20, Parsons, Kansas.

WE START YOU WITHOUT A DOLLAR—Soaps, extracts, perfumes, toilet goods. Experience unnecessary. Carnation Co., 278, St. Louis, Mo.

MEN WANTED TO CANVASS FARMERS. \$100 monthly and expenses. Write for particulars. Bigler Co., M-2, Springfield, Ill.

MAKE \$10 EVERY DAY INTRODUCING NEW automatic window washer. Amazing invention. Send for free sample offer. National Industries, 67 E. Lake, Dept. 193, Chicago.

\$50.00 WEEKLY. MEN WANTED TO DEMONSTRATE and take ten orders daily direct from motorists. Amazing magnetic trouble light. Sticks anywhere! More orders, bigger pay. Write for demonstrator and particulars. Magno Co., 6 Beacon St., Dept. 143, Boston, Mass.

AGENTS—90C AN HOUR TO ADVERTISE OUR goods and distribute free samples to consumers. Write quick for territory and particulars. American Products Co., 2405 Monmouth, Cincinnati, O.

### BEEES

BEEES DOUBLE AND TRIPLE FRUIT CROPS. Every orchard, large or small, whether apple, cherry, peach or pear, should certainly have bees for big crops and fine quality. Spring is the time to start. We will be glad to give you our 40 years' experience in starting you right. Send for our free booklets, "Bees and Fruit" and "Bees for Pleasure and Profit." These books discuss the whole subject of bees and pollination for the orchard owner. Address The A. I. Root Company, 611 Liberty St., Medina, Ohio.

### BULBS

DAHLIA BULBS, 85C DOZEN, 10C EACH, MOST colors. Carlota Gardens, Perryville, Ind.

### CHICKS

HELM'S ILLINOIS ACCREDITED CHICKS—heaviest layers. Contest winners postpaid. Leghorns, Anconas, heavy assorted, \$11; Rocks, Reds, \$13; Wyandottes, Orpingtons, \$14. Illinois Hatchery, Metropolis, Ill.

### DOGS

COONHUNTERS, TRY ONE OF GEORGIA'S BEST four-year-old coonhounds, will trail and tree in icy water. Free trial allowed. D. D. Scott, D-116, Calhoun, Ga.

HUNTING HOUNDS, CHEAP. TRIAL DIXIE Kennels, SC-26, Herrick, Ill.

### FARMS AND ORCHARDS

FOR SALE—475-ACRE FRUIT FARM IN OHIO'S famous "Island District." 18,000 bearing trees. 6000 grapes, 5200 2-4 year trees. Some farm land and hunting marsh. Excellent roads and marketing facilities. Good schools, churches and summer vacation facilities. Address V. H. Davis, Port Clinton, Ohio.

42-ACRE FRUIT FARM IN THE OZARKS. Miller county; 2 miles from college town of Iberia. 500 mature fruit trees; nice cottage; immediate possession; part cash and easy terms. Cliff H. Clark, Iberia, Mo.

### FARMS WANTED

CASH FOR YOUR PROPERTY, FARM, BUSINESS or residence. No matter where located. Free information. International Realty Co., Ford Bldg., Detroit.

WANT TO HEAR FROM OWNER HAVING farm for sale; give particulars and lowest price. John J. Black, Box 68, Chippewa Falls, Wis.

WANTED—TO HEAR FROM OWNER OF LAND for sale for spring delivery. O. Hawley, Baldwin, Wis.

### FUR RABBITS

MAKE BIG MONEY WITH CHINCHILLA Rabbits. Real Money Makers. Write for facts. 846 Conrad's Ranch, Denver, Colorado.

### HELP WANTED

POSITIONS WANTED BY WELL-TRAINED graduates of The National Farm School, 20 years of age, unmarried, as greenhouse men, truckers, vegetable or fruit gardeners, nursery men or landscape gardeners. Ready for employment April 1. Will be glad to hear from well operated farms wanting help. Communicate, C. L. Goodling, Dean, Farm School, Pa.

### LIVE STOCK

CHOICE GUERNSEY OR HOLSTEIN CALVES, shipped subject to inspection. Edgewood Farms, Whitewater, Wis.

### MISCELLANEOUS

OLD MONEY WANTED—WILL PAY YOU \$100.00 for 1894 dime, 8¢ mint, \$50.00 for 1913 Liberty head nickel (not Buffalo). Big premiums paid for all rare coins. Send 4¢ for large coin folder. May mean much profit to you. Numismatic Co., Dept. 546, Ft. Worth, Tex.

### NURSERY STOCK

DANIEL'S RED DUCHESSE—THE MOST PROFITABLE early red apple. Catalog free. Daniel's Nursery Co., Long Lake, Minn.

QUALITY OZARK GROWN TREES—SMALL Fruits, Ornamentals, Roses, Garden Plants, Seeds. Special prices to large planters. Teachers "Beauty School" Free—\$100 prize. Catalog. Salesmen wanted. Service and Satisfaction. Clever-Aurora Nursery Co., Aurora, Mo.

APPLE AND PEACH TREES, 5C AND UP; grapevines, 3c; best varieties. Catalog free of fruits, berries and ornamentals. Benton County Nursery, Box 500, Rogers, Ark.

NEW POPULAR PRICED CATALOG. FRUITS, nuts, ornamental. Prepaid. Ozark Nursery, Rogers, Ark.

CONCORD GRAPE VINES, STRONG 3 YR., \$6.50 per 100. Order now. Brier-Crest Nursery, Mt. Carmel, Ill.

YOUNG BERRIES AND HOW TO GROW THEM. free. \$5600 from 4 1/2 acres 1 year old. Plants from us of this marvelous new type berry now growing in 20 states. Acme Berry Gardens, Chino, Calif.

### NUTS

BUDDED NUT TREES, HARDY NORTHERN varieties, early and prolific bearers of large, thin shelled nuts. Catalog free. Indiana Nut Nursery, Route B, Rockport, Ind.

### PLANTS

100 GENUINE MASTODON EVERBEARING, \$1.85; 400 up, \$1.50 hundred. World's largest strawberries. Why pay more? Champion everbearing originator. Illustrated plant, seed catalog free. Edward Lubke, New Buffalo, Mich.

MASTODON EVERBEARING STRAWBERRY plants direct from originator. June varieties, also flower bulbs. Catalogue free. E. M. Kime & Sons, Twelve Mile, Indiana.

ELDORADO BLACKBERRY PLANTS, ONLY \$2 hundred. \$15 thousand. Strong, healthy, state inspected. Order today from this ad. Charles Rickart, Box No. 32, Rosedale, Kansas.

NEW SOIL SMALL FRUIT PLANTS. STRAWberries (Mastodons), blackberries, raspberries, shade trees, shrubbery, bulbs. Reasonable prices. Cloverleaf Nursery, Three Oaks, Mich.

LATHAM RASPBERRY, HARDY, LARGE SIZE, enormously productive. \$3.50 per hundred plants. True Latham, double inspected. C. D. Wright, Hamburg, Iowa.

MOAIC FREE LATHAM RASPBERRY AND Beaver strawberry plants. A. B. Coleman & Son, Aitkin, Minn.

### SPRAY FORMULA

SPRAY TREES WITH MCCARTY'S OIL EMULSION government formula; cheapest, most effective garden and field seeds. McCarty Seed Company, Evansville, Indiana.

### TOBACCO

GUARANTEED OLD HOMESPUN TOBACCO: chewing, 5 lbs., \$1.50; smoking, 5 lbs., \$1.25. Pay when received. Pipe free. Farmers Union, G-8, Paducah, Ky.

## A New Method in Grafting

(From Page Seven)

### Handling Scions or Buds

layer remains elastic. A thick layer will crack and allow the entrance of air, dew or rain water to spoil the graft.

The form of paraffin which will be serviceable for most purposes is the common parowax, which may be obtained at any grocery. Various forms of melters are employed. A practical handy paraffin melter sold by Edwin C. Tyson of Flora Dale, Pa., is the one which I employ. It consists of a transformed railroad lantern with alcohol burner. A paraffin melter sold by the late J. F. Jones of Lancaster, Pa., and still to be obtained from his estate, consists of a cup and box, the latter carrying a charcoal fire. C. R. Biederman has devised a melter described in Bulletin 76 of the University of Arizona Agricultural Experiment Station, a kerosene burner.

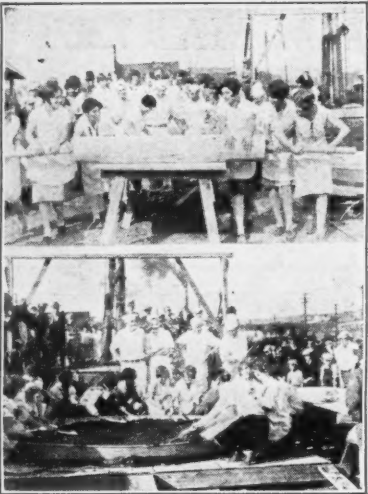
The cutting and shaping of scions in the field consumes valuable time. This may be spared if we cut and shape scion grafts or bud grafts in the evening in preparation for the next day's work, provided that they are immediately tossed into Kudson solution in a pail which is carried to the field and the scions or buds taken out as wanted. The Kudson solution may be put up by any druggist and consists of the following ingredients:

225 gm. CaCl<sub>2</sub>  
125 gm. NaCl  
150 gm. KCl  
1 liter H<sub>2</sub>O

This formula was devised by Prof. Lewis Kudson of Cornell University. Cut buds or trimmed scions immersed in this solution will remain fresh for 24 hours or longer.

## WHAT THE CAMERA SEES

AMERICAN FRUIT GROWER MAGAZINE will pay Five Dollars for the photo selected each month as the PRIZE PHOTO, and will pay One Dollar each for other photos not receiving the prize money but which we are able to use. Send your photo, illustrating anything of interest to the fruit grower, with a short item telling the FACTS about the picture. Address photos to the Editor. If not suitable for our use, your photo will be returned.



This is how the apple growers of Yakima, Wash., made the world's largest apple pie. In the picture above the crust is being rolled, co-operatively. Washington is strong for co-operative movements, even to running the rolling pin, so it seems. In the lower picture the pie is being fed to school children. Why didn't they mail the pie to the President?



High school students learn to be proficient "gunmen" at Shawnee Mission, Kans., under the tutelage of A. L. Berry, the instructor in agriculture at that place. The story appeared in the February issue.



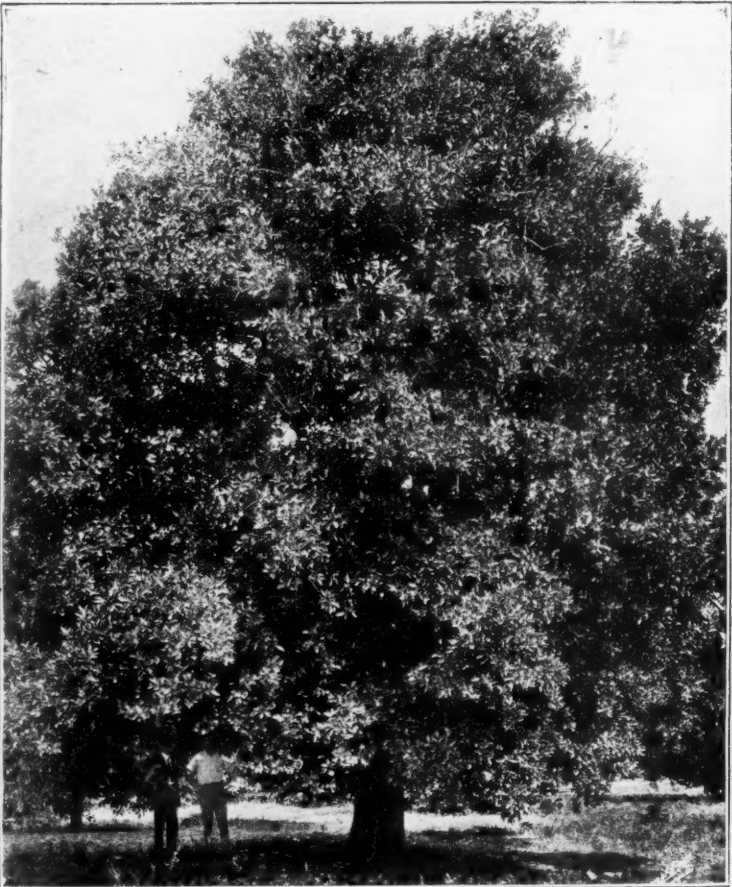
A real "orchard home" in 80 acres of apples, owned by Mrs. Joseph Weston, one of Missouri's leading fruit growers.



Californians beat the mud with "crawler" type tractors, and deliver fuel oil to their orchard heaters. Mud in that "wonderful climate?" Frost?



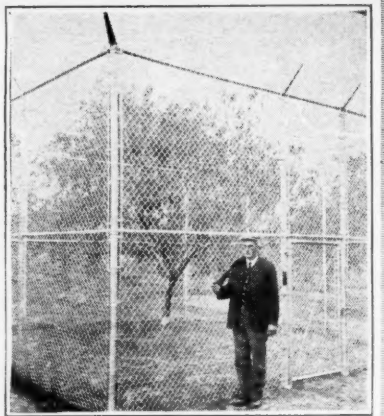
Page Barney Oldfield. He probably never had a more strenuous race, or one with less tire trouble, than these seven tractor drivers in cultivating the world's largest vineyard, in California.



The "Daddy of Florida Orange Trees," said to be the largest orange tree in the world, is located in the Mt. Carmel grove 13 miles west of Tampa. According to Elise Infantino, who sends the picture, the tree is 60 feet tall, has a spread of 125 feet and a trunk diameter of 4 1/2 feet. In one season it bore, by actual count, 10,200 oranges. Allowing 200 to the box, this would be 51 boxes in one crop, and would supply enough cash to permit one to stay at a Florida resort hotel for several days. [Prize Photo.]



No, this is not a new type of Hubbard squash, as comparison of its size with that of the match box might indicate. It is a Kieffer pear, offered by Edward Clary, Missouri, as the prize bit of fruit for the Middle West. It weighs a pound and ten ounces in its stocking feet.



This peach tree, belonging to J. E. Markham, Illinois, is caged on account of its superior merit. The modern burglar-proof steel wire cage with its barb wire entanglement above should afford adequate protection against terrestrial pilferers. Is the rifle for use against hostile aircraft?



This seedless, "everbearing" apple tree grows in the yard of M. O. Walker, at Burbank, Calif., but not in a tub, as a casual glance at the picture might lead one to believe. (That's a California lunch pail behind the tree.) Give a town a name like that and there's no telling what will happen there, according to Delphia Phillips, who sends in the picture.



Carrying water for household purposes is getting to be a lost art on fruit farms. Do you still do it? Hand your husband the empty water pail every time he comes near the house. Hand it to the hired man. Make 'em hustle three pails after supper. Surprisingly soon you'll have water piped into the house.

# American Fruit Grower Magazine for April

**T**HE EFFORTS entering into a profitable crop of fruit are very often sowed in the spring, nurtured through the summer and reaped in the fall. There are two dependable workers whose services, if used in the spring and summer, will almost insure the

## Two Dependable Workers Who Insure Fruit Crop Profits

certainty of a profitable crop of fruit. The names of these servants are Timeliness and Thoroughness. Their services cost little or nothing, but they cannot work to best advantage unless directed by Intelligent Interest.

Beginning with the earliest spray and dust operations, on the fruits to which these control methods apply, and with every subsequent application, Timeliness and Thoroughness are the main guarantees of effectiveness. They are of as much importance as the materials used and the equipment with which the spray or dust is applied.

The cultural operations, the application of fertilizers, thinning the crop when thinning is necessary, sowing the cover crop where this form of soil management is in use, and practically every other operation up to and including the harvesting and marketing of the crop itself—each operation is more certain to result in fruit profits if done at the right time and in a thorough manner.

The man or woman who "gets acquainted" with the needs of the tree and plant, and who takes an intelligent interest in their welfare, will make the utmost use of the fruit grower's most valuable servants—Timeliness and Thoroughness.

**R**ESPONSE from our readers to our recent request for pictures of fruit scenes has been gratifying indeed, as a glance at page 26 of this issue will disclose. We wish at this time to qualify our request as expressed in the March editorial. Our readers are

## Send Us Your Fruit Pictures for "What the Camera Sees"

primarily interested in pictures pertaining to the varied phases of growing and marketing fruit. The statement that "the most interesting 'products' of the fruit farms are the boys and girls" has apparently met with very general approval, judging from the number of children's pictures received. We would like to use them all. Some time we may run a solid page of children, but this might require more diplomacy than the editor of the Picture Page possesses, because, in the few weeks since the mailing of the March issue and this writing, enough children's pictures have been received to fill four pages!

Hence, while not receding an inch from the position that children are the most interesting feature of the fruit farm, or any other farm, we request that our readers send only such pictures of boys and girls as will show them in connection with some activity of the fruit farm work.

Just a little while and the fruit picking will start. Then get out your camera and snap the boys and girls at work, or play, in the berry field or orchard.

And keep on sending the pictures, with the stories. We have a good supply, but there is room inside the magazine when the Picture Page overflows, as it did this month.

Two five-dollar prizes were awarded for pictures this month, as it was difficult to decide which was the better of the two on which prizes were awarded. It may happen again.

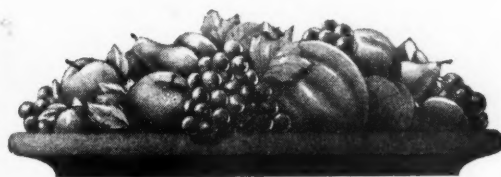
Send as complete a story as possible with the picture, giving all the details. It may be necessary for us to condense your story, but, as is the case with two of the pictures this month, we may be able to use your entire story. In this case, additional payment at space rates will be made when the picture and story appear.

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CHESTER G. CAMPBELL, Managing Editor

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HARLEY F. WILSON Fruit Farm Beekeeping  
HAZEL BURSELL The Fruit Grower's Wife

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